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January
1959
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The EDISON ELECTRIC INSTITUTE BULLETIN

Published Monthly by
Edison Electric
Institute

Electric Industry's Record in 1958

J. E. Corette

27th EEI Convention Notes

EEI's National Electric Living Program

Utilities' Future Use of Atomic Energy

Arthur S. Griswold

ELECTRICAL RESEARCH STATISTICS
THE ELECTRIC LIGHT AND POWER INDUSTRY

Current Statistical Data Covering 100 Per Cent of Industry

(Includes Investor-Owned Companies, Cooperatives, and Government-Owned Utilities)

October 1957-1958

SOURCE AND DISPOSAL OF ENERGY—MONTH OF OCTOBER

	1958	1957	%
NET GENERATION* (Kwhrs in Thousands)			
By Fuel Burning Plants	44,543,218	43,115,811	+ 3.3
By Water Power Plants	10,813,649	10,041,385	+ 7.7
Total Generation	**55,356,867**	**53,157,196**	**+ 4.1**
ADD—Net Imports Over International Boundaries	268,863	237,773	+13.1
Less—Company Use	159,553	147,818	+ 7.9
Less—Energy Used By Producer	1,514,738	1,199,372	+26.3
Net Energy for Distribution	**53,951,439**	**52,047,779**	**+ 3.7**
Lost and Unaccounted for	5,728,383	5,743,729	− 0.3
Sales to Ultimate Customers	**48,223,056**	**46,304,050**	**+ 4.1**

CLASSIFICATION OF SALES

NUMBER OF CUSTOMERS—As of October 31st			
Residential or Domestic	47,557,772	46,690,716	+ 1.9
Rural (Distinct Rural Rates)	1,668,241	1,643,646	+ 1.5
Commercial or Industrial:			
Small Light and Power	6,283,057	6,200,054	+ 1.3
Large Light and Power	316,804	311,959	+ 1.6
Other Customers	188,191	181,595	+ 3.6
Total Ultimate Customers	**56,014,065**	**55,027,970**	**+ 1.8**
KILOWATTHOUR SALES—During Month of October (Kwhrs in Thousands)			
Residential or Domestic	12,462,020	11,493,311	+ 8.4
Rural (Distinct Rural Rates)	901,335	908,473	− 0.8
Commercial or Industrial:			
Small Light and Power	8,699,149	7,969,037	+ 9.2
Large Light and Power	24,215,509	24,120,255	+ 0.4
Street and Highway Lighting	493,278	456,810	+ 8.0
Other Public Authorities	1,098,040	988,357	+11.1
Railways and Railroads:			
Street and Interurban Railways	156,464	179,571	−12.9
Electrified Railroads	144,059	146,316	− 1.6
Interdepartmental	53,202	41,920	+26.9
Total to Ultimate Customers	**48,223,056**	**46,304,050**	**+ 4.1**
Revenue from Ultimate Customers (Thousands)	**$821,372**	**$771,174**	**+ 6.5**

RESIDENTIAL OR DOMESTIC SERVICE

AVERAGE CUSTOMER DATA—for 12 months ended October 31, 1958			
Kilowatthours per Customer	3,346	3,135	+ 6.7
Average Annual Bill	$84.69	$80.26	+ 5.5
Revenue per Kilowatthour	2.53¢	2.56¢	− 1.2

* By Courtesy of the Federal Power Commission.

THE EDISON ELECTRIC INSTITUTE BULLETIN is published monthly by the Edison Electric Institute, an association of electric light and power companies in the United States and its territorial possessions. Its affiliate members consist of members of the Canadian Electrical Association and private electric utilities in Latin America and contiguous islands in the Western Hemisphere.

The objectives of the Edison Electric Institute are:

The advancement in the public service of the art of producing, transmitting, and distributing electricity and the promotion of scientific research in such field.

The ascertainment and making available to the members and the public of factual information, data, and statistics relating to the electric industry.

To aid its operating company members to generate and sell electric energy at the lowest possible price commensurate with safe and adequate service, giving due regard to the interests of consumer, investor, and employee.

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Closing date for the BULLETIN is the tenth of the month preceding the month of issue.

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The EDISON ELECTRIC INSTITUTE BULLETIN

January, 1959

Vol. 27 No. 1

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CONVENTIONS AND MEETINGS

1959

JANUARY

5- 6 EEI Accounting Division Advisory & Executive Committee, Louis XVI Suite, Waldorf Astoria Hotel, NYC.

8-10 Third Annual LBE National Women's Conference, Chicago, Ill.

12-13 PEA Advertising Committee, Harrisburg, Pa.

15-16 EEI Industrial Power & Heating Group, Biltmore Hotel, Atlanta, Ga.

15-16 Joint EEI Industrial Relations Committee-Personnel Practices Comm ttee of the Pennsylvania Electric Association, Carlton House, Pittsburgh, Pa.

16 Oklahoma Utilities Association Accounting Section, Biltmore Hotel, Oklahoma City

22 PEA Customer Contact Committee, Johnstown, Pa.

22-23 PEA Communications Committee, Pittsburgh, Pa.

23 PEA Industrial Committee, Philadelphia, Pa.

26-29 Canadian Electrical Association Eastern Zone Meetings, Chateau Frontenac, Quebec, P. Q.

28-30 EEI-AGA Taxation Accounting Committees, Muehlebach Hotel, Kansas City, Mo.

29-30 EEI Commercial Cooking & Water Heating Committee, Sheraton Hotel, Philadelphia, Pa.

29-30 PEA Accident Prevention Committee, Harrisburg, Pa.

29-30 PEA Structures & Hydraulics Committee, Benjamin Franklin Hotel, Philadelphia, Pa.

29-30 PEA Systems Operation Committee, Johnstown, Pa.

29-30 PUAA Region 9 Meeting, Timberline Lodge, Portland, Ore.

FEBRUARY

2- 4 EEI Prime Movers Committee, Hotel Beaumont, Beaumont, Texas

5- 6 EEI Commercial Lighting Committee, Sheraton Hotel, Philadelphia, Pa.

5- 6 Missouri Valley Electric Association Industrial and Commercial Sales Conference, President Hotel, Kansas City, Mo.

5- 6 PEA Land & Land Rights Committee, Philadelphia, Pa.

5- 6 PEA Transmission & Distribution Committee, Philadelphia, Pa.

9-10 EEI Electric Space Heating & Air Conditioning Committee, Los Fresnos, Texas

12-13 EEI Transmission and Distribution Committee, Morrison Hotel, Chicago, Ill.

12-13 Pacific Coast Electrical Association Business Development Conference, Hotel Sheraton-Palace, San Francisco, Calif.

12-13 PEA Prime Movers Committee, Pittsburgh, Pa.

16 Pacific Coast Electrical Association Board of Directors Meeting, Honolulu, Hawaii

16 PEA Purchasing Committee, Philadelphia, Pa.

16-17 EEI-AGA Accounting Conference Final Working Committee, Lord Baltimore Hotel, Baltimore, Md.

16-17 EEI Electrical System & Equipment Committee, Atlanta Biltmore Hotel, Atlanta, Ga.

16-17 PEA System Planning Committee, Philadelphia, Pa.

19-20 PEA Electrical Equipment Committee, Philadelphia, Pa.

19-20 PEA Motor Transportation Committee, Philadelphia, Pa.

22-25 North Central Electric Association (North Central Electric League Meeting), Leamington Hotel, Minneapolis. Minn.

26-27 15th Annual National Wiring Sales Conference, Jung Hotel, New Orleans, La.

26-27 PEA Relay Committee, Pittsburgh, Pa.

26-27 PUAA Region No. 1 Meeting, New Haven, Conn.

MARCH

5- 6 Joint EEI Industrial Relations Committee-Personnel Administration Section, Southeastern Electrical Exchange, Mayflower Hotel, Washington, D. C.

9-12 EEI Sales Conference, Edgewater Beach Hotel, Chicago, Ill.

18 PEA Personnel Practices Committee, Philadelphia, Pa.

19 PEA Customer Contact Committee, Hagerstown, Md.

23-25 Canadian Electrical Association Western Zone Meetings, Royal Alexandra Hotel, Winnipeg, Man.

23-25 Southeastern Electric Exchange Annual Conference, Boca Raton Hotel & Club, Boca Raton, Fla.

24-25 PEA Street & Highway Lighting Committee, Pittsburgh, Pa.

25 Oklahoma Utilities Association Accounting Section, Mayo Hotel, Tulsa, Okla.

26-27 Oklahoma Utilities Association Annual Convention, Mayo Hotel, Tulsa, Okla.

27-29 Pacific Coast Electrical Association Board of Directors Meeting, Bass Lake, Calif.

30-31 Pacific Coast Electrical League Engineering and Operating Conference, Hotel Lafayette, Long Beach, Calif.

APRIL

6- 8 EEI 27th Annual Convention, New Orleans, La.

6- 9 EEI-AGA 18th Annual Conference on Operation of Public Utility Motor Vehicles, Netherland Hilton Hotel, Cincinnati, Ohio

8- 9 Pacific Coast Electrical Association Administrative Services Conference, Hotel Lafayette, Long Beach, Calif.

15-17 Missouri Valley Electric Association Engineering Conference, President Hotel and Municipal Auditorium, Kansas City, Mo.

16-17 EEI Electric Power Survey Committee, EEI Headquarters, New York City, N. Y.

20-22 EEI-AGA National Conference of Electric and Gas Accountants, Sherman Hotel, Chicago, Ill.

27-29 EEI Meter & Service Committee, Chase Hotel, St. Louis, Mo.

30-May 1 EEI Statistical Committee, Dearborn Inn, Detroit, Mich.

MAY

4- 6 EEI Prime Movers Committee, Palmer House, Chicago, Ill.

4- 6 EEI Purchasing and Stores Annual Meeting, Hotel Soreno, St. Petersburg, Fla.

7- 8 EEI Transmission & Distribution Committee, Shoreham Hotel, Washington, D. C.

20-22 Pacific Coast Electrical Association Annual Convention, Fairmont Hotel, San Francisco, Calif.

JULY

6- 8 EEI Accident Prevention Committee, Biltmore Hotel, Los Angeles, Calif.

SEPTEMBER

14-15 EEI-AGA 1959-1960 Accounting Division & Section Organization Meetings, Hotel Cleveland, Cleveland, Ohio

In a year marked by a general decline among all business, the electric utility industry established a number of new record highs. Generation, construction expenditures, revenues, earnings, customers and taxes all reached new highs in 1958.

The Electric Industry's Record in 1958

By J. E. Corette
President, Edison Electric Institute, and
President, The Montana Power Co.

OUTSTANDING among the encouraging influences during the 1957-58 recession were the stability and progress of the electric utility industry.

While industrial production, as measured by the Federal Reserve Board, declined over 19 points, electric production more than held its own. Generation by all components in the industry totalled 641 billion kwhr, an increase of 10 billion kwhr over 1957.

Railway and industrial generation declined slightly in 1958, however, so when the combined output of these plants is added to that of the electric industry, total electric production for the nation in 1958 reaches 721 billion kwhr. This exceeds last year's figure by 5 billion kwhr.

Built-in Stabilizers

The electric industry has some built-in stabilizers, the most prominent being constantly increasing residential use per customer and the constant increase in number of customers. In 1958 average annual usage of electricity per domestic customer reached another new high of 3,385 kwhr. This represents an increase of 211 kwhr over last year. The striking long-term growth in this sector of electricity consumption in the USA is plotted in Figure 1 which shows average annual usage by rural and residential customers since 1937. The persistent and consistent way home kilowatt-hour consumption has increased, during all phases of business activity, is striking.

Million New Customers

The electric industry added another million customers in 1958, bringing the total at the year end to 56.2 million. Over 85 percent of these additional customers are residential. This is an accurate reflection of the growth of our nation. Population estimates predict a figure of over 200 million persons in less than 10 years hence. These new citizens, as well as those of us presently here, will create still greater demands for all our nation's products, including electricity. The electric industry expects residential demand to keep to its current trend, and use of from 6,000 to 8,000 kwhr per domestic consumer per year by 1968 is not an idle speculation.

New Construction Expenditures at All-Time High

Because of the three years "lead time" required to get new power-producing facilities ready for use, the electric industry must plan well ahead of customer demand. Temporary business declines cannot cloud the industry's long-term vision. In 1958, for example, the investor-owned companies spent $3.8 billion on new plant and equipment investment, an increase of $100 million over

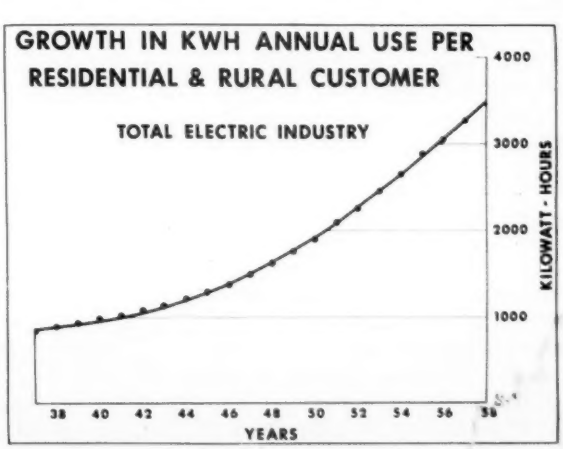


Figure 1

the 1957 record high. With total business investment (all industries) declining in 1958, from $37 to $31 billion, the investor-owned electric companies' confidence in the nation's future greatly helped to prop up this key component in our over-all economy.

Electric plant investment equalled 12.5 percent, or one-eighth, of all business investment in 1958. In 1958 the electric industry made the largest annual single increase in generating capability in the industry's history.

14 Million Kw of New Generating Equipment

Fourteen million kw of new generating equipment came on the line in 1958. Of this amount 11.5 million kw were added by the investor-owned electric companies and the remainder by governmental agencies. The new additions increased America's electric utility generating capability to 149.5 million kw at year-end 1958. By way of comparison, more kilowatts of generating capability were added than the industry had in operation in 1920, or again, 1958's additions approximate the amount added from 1945 to 1949, a period of five years.

The electric industry expects to keep right on adding to America's power supply. Construction expenditures by electric companies in 1959 are expected to equal the $3.8 billion expended in 1958 on new plant and equipment. About 13.6 million more kilowatts of capability will be brought into service in 1959; 10.2 million by the companies, and 3.4 million by governmental agencies. In 10 years the electric industry is expected to be adding over 20 million kw a year just to keep abreast of a consumer demand estimated at 1,300 billion kwhr for the year 1968.

Revenues Up

During the recession, total corporate profits of all industries suffered one of the sharpest declines in history —dropping 30 percent. However, earnings of the nation's investor-owned electric companies as a whole were better than in 1957. Gross revenues in 1958 were $8,416 million; in 1957 they were $8,054 million. Net income was $1,534 million in 1958 versus $1,427 million in 1957.

A growth industry, such as the electric industry, with considerable insulation from the fluctuations of the business cycle, is important to investors—of which there are presently nearly 4 million—to employees and to customers.

Wages and Salaries

During the recent business decline, compensation to all employees in all industries fell off about 2 percent. But in the electric utility industry wage and salary compensation ran up from $1,426 million in 1957 to $1,490 million in 1958, an increase of almost 5 percent. Steady jobs at good pay are an important factor in retaining the reliable and dedicated personnel necessary in the electric utility industry.

Fuel Costs

Fuel, another important expense, cost power companies $465 million in 1958, a 1.2 percent decrease from 1957. Due to favorable water conditions throughout the country, hydro generation accounted for a larger share of total electric utility generation. In 1957, falling water sources generated 20.6 percent of the total, whereas in 1958 hydro generation was estimated at 22.1 percent of the total.

Two Billion in Taxes Paid by Investor-Owned Companies

Investor-owned electric companies will pay approximately $2 billion in taxes for 1958, up over the previous year's total by nearly $150 million. These payments to all levels of government, Federal, State, and local, represent a fantastic figure when it is considered that an equal amount was paid by all the 48 state governments for unemployment benefits to more than 3½ million unemployed workers during the year.

One of the reasons behind the anticipated $12.5 billion Federal deficit this year is the lower tax payments from recession-hit corporations. Had utility net income decreased, the Federal deficit would be even higher. Considering the plight of government finances, it appears not only discriminatory but irresponsible to continue the preferred tax position of government-owned and government-financed power projects. Customers of government power, as more and more people are beginning to realize, do not pay their fair share of our national tax burden.

Electricity Cost—Minor Item in Householder's Budget

Despite the recession, the Consumers' Price Index moved to a high of 123.9 in July, 1958 (1947-49 = 100). In contrast, the average revenue per kilowatt-hour sold to domestic customers maintained its steady decline. In 1958 average revenue was 2.52 cents, down from 2.56 cents in the previous year. Increased consumption, the promotional character of electric rates, as well as operating efficiencies, have all contributed to this enviable record.

Latest available figures show that of each dollar spent by consumers, only 1.32 cents went for electricity, whereas 2.13 cents were spent for tobacco, 3.00 cents for gasoline and 5.18 for recreation.

Rate Increases and Inflation

Regulatory commissions continue to recognize the inflationary inroads on practically all aspects of operational and capital costs, and the necessity for the financial strength essential to the provision of adequate electric service.

From 1946 through the first 11 months of 1958, according to tabulations of the Edison Electric Institute, there were 542 applications for rate increases, involving 220 companies. Of the 542 applications, 476 were granted, 32 are pending, 13 were withdrawn, and 21 denied. The 1958 record to December 1 shows 58 actions. Thirty increases were granted, 27 of the 1958 applications are still pending, and one was denied.

Electric Living Program

The Edison Electric Institute Board of Directors in 1958 approved an Institute-sponsored National Electric Living Program aimed at further increasing the home use of electricity. Approximately two-thirds of the Institute's member companies are already participating in this promotional enterprise with some $2½ million pledged for the 1959 program, which will be launched during National Electrical Week, Feb. 8-14.

The program is designed to represent a rallying point

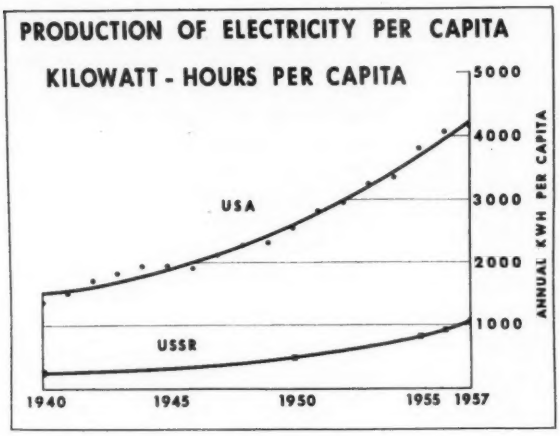


Figure 2

for manufacturers and other trade allies in the electrical field to concentrate and coordinate their selling efforts in the residential market. EEI plans to use national television, newspapers, magazines and other media in carrying out this new program. With this basic activity, strongly supplemented by the integrated advertising and promotion efforts of electrical manufacturers and others, the industry expects to achieve a new effectiveness in selling electrical living at both national and local levels.

Progress in Electricity from Nuclear Energy

The electric utility industry in 1958 continued its substantial efforts to hasten the day when economic electricity from nuclear fuels can be produced. One of the most significant steps toward this goal was the formation in November of the largest nuclear power group in the United States—High Temperature Reactor Development Associates, Inc. Composed of Philadelphia Electric Co. and more than 50 other electric utility companies, HTRDA has offered to develop and build a high-temperature, gas-cooled nuclear power plant which may provide a short cut to the goal of economic nuclear power.

Philadelphia Electric Co. and HTRDA will spend $24.5 million to construct the 40,000-kw prototype plant which would be completed in 1962 or early in 1963.

Construction and operation of such a plant was viewed by the electric industry as an important step toward the achievement of economically competitive atomic power.

In addition to being the largest nuclear group in the United States, HTRDA is the most widely representative group of U.S. utility companies to support a single nuclear power project thus far.

129 Companies in Projects

One hundred twenty-nine electric utility companies, serving most of the nation's consumers, were participating in one or more of 28 nuclear power research, development and construction projects or studies at the end of 1958.

Late in 1957, the world's first full-scale atomic power plant devoted exclusively to peaceful uses went into operation at Shippingport, Pa., and early in 1958 the plant was developing more than 60,000 kw of power for the city of Pittsburgh. Its ultimate capacity will be even greater.

Since 1954 when Congress passed a new Atomic Energy Act which permitted industry to develop and construct its own nuclear power plants, electric power companies have embarked on a substantial number of nuclear projects. This expanding program, carried on in cooperation with the manufacturers and AEC, at present includes 16 announced nuclear power plant construction projects involving a total utility company investment of more than $540 million. There are also 12 other nuclear research, development and study projects calling for continuing expenditures of additional sums of money. One research program is a multi-million dollar project in the field of controlled thermonuclear (fusion) reaction.

Of the 16 nuclear power construction projects, three are now in operation, producing power being utilized on company systems. Another six projects are either under construction or contract, while the remaining seven are in various planning stages.

Electric Power in Russia and the USA

In spite of Russian claims, Soviet total electric generating capacity is less than the total of new capacity installed in 1958 and to be installed in the next three years by the U.S. electric industry.

The total installed capacity in the USSR as reported by the Soviet Power Ministry was 48.3 million kw at the end of 1957. During the four years, 1958, 1959, 1960 and 1961, the United States will install a total of more than 50 million kw of new capacity.

Premier Khrushchev announced in November that the Soviet government expects annual Russian output of electric power to reach 500 to 520 billion kwhr in 1965. By the same year, United States output is expected to reach 1¼ *trillion* kwhr annually. In considering a comparison of this kind, it should be recognized that the Russians have a history of consistency in failing to reach goals such as they have set in electric power, while in the United States the electric industry has a long-established record of making carefully considered predictions and then exceeding them in actual growth.

USA, USSR Projections

In electric generating capacity, the Soviet Union has announced plans for adding 60 million kw by 1965. The total to be reached by that year would be 108 million kw for Russia, if their expectations are met. This compares with an estimated 250 million kw which the United States will have installed by 1965.

The Soviet Union plans to add an average of about 7½ million kw of capacity a year to 1965. During the same period, the United States will be adding an average of over 14 million kw annually.

Total electric sales per capita in the USA in 1957 were four times those of the USSR, but residential and rural sales per capita were six times those of Russia.

In 1957, the United States generated about 4,180 kwhr of electricity per capita. Russian per capita production in the same year was 1,045 kwhr. Soviet output per capita now is about where the United States was in 1938—some 20 years behind. (Figure 2.)

Industry Allies Plan Support of National Electrical Week

ADVANCE reports from 157 individual companies and local committees throughout the United States and Canada indicate that there will be widespread participation in National Electrical Week activities, Feb. 8-14.

The announcement came from N. J. MacDonald, President, The Thomas & Betts Co. and Chairman, the National Electrical Week Committee. Mr. MacDonald reported that companies within the electric industry, as well as local and regional NEW committees, have scheduled strong support of the Week through radio, television, magazines, newspapers, company publications and through special educational and promotion programs.

Following are some of the NEW activities planned by some of the more than 50 major companies and corporations that engage in national advertising:

Allis-Chalmers Manufacturing Co. will run a special color advertisement featuring NEW in *Time, U. S. News and World Report, Newsweek, Business Week, Fortune* magazines, and an ad in the *Wall Street Journal.* NEW Chairman MacDonald will make a two-minute radio address on the National Farm & Home Hour program on the Saturday preceding the Week. There also will be local and regional radio broadcasts, and plant-city newspaper advertisements will carry special mention of the celebration. The company is also sending a special promotional kit to 11,500 utility executives, offering a variety of material, at no cost, for their use or distribution.

Amana Refrigeration, Inc., reports that it will salute NEW on its two television programs, the "Peter Lind Hayes Show" and Johnny Carson's "Who Do You Trust"—both over the entire television network of ABC.

Cavalier Corp. will encourage its distributors and electrical contractors who handle Cavalier electric heating equipment to tie in with NEW through newspaper, radio and television advertising.

Frigidaire plans to display three new electric kitchens in Dayton, Ohio. All dealers will be asked to use the NEW slogan in advertisments from Jan. 15 to Feb. 14. The company is sending 1959 NEW Planning Guides to all districts, and all of the company's correspondence will feature NEW on the stationery.

General Electric Co. will kick off NEW with a special "Electricity Builds Jobs" message on the Feb. 8 telecast of the General Electric Theater. Locally developed NEW programs in GE's more than 100 decentralized product departments across the nation will include: local radio and television messages, presentations of Edison lamp replicas to city and state officials, community speaking engagements by plant officials, plant tours for community neighbors, essay contests for school children, window displays and reception room exhibits of electrical interest and others.

Ohio Brass Co. plans to give strong support to Live Better Electrically, and salute NEW in trade publication advertisements and editorial content.

Reynolds Metals Co. has scheduled special television commercials on two of its national shows—"Walt Disney Presents" and "All Star Golf Show"—both on the ABC network.

Smoot-Holman Co. plans to carry advertising salutes during the Week.

The Thomas & Betts Co. will conduct an essay contest for employees' children on the value of electricity. The company will also sponsor Science Youth Day activity. It plans to use NEW to kick off a full year of activities to better inform its employees and community on the benefits of electricity.

Westinghouse Electric Corp. reports it will run a tie-in advertisement in either *Time* or *Newsweek* during the Week. It will also tie in the Week on one or more commercials on the "Lucille Ball-Desi Arnaz Show" over the CBS television network. The company will also have the Westinghouse Broadcasting Co. promote NEW on its radio and television stations.

Sales Promotion Awards Contest Deadlines!

Feb. 1, 1959

Entries for the Farm and Industrial Sales Promotion Contests

Feb. 15, 1959

Entries for the Residential and Commercial Sales Promotion Contests

Awards Committee

Edison Electric Institute

0 Third Ave. *New York 17, N. Y.*

'Electric Power for a Strong America' Is Theme of 27th EEI Convention

Program at New Orleans Meeting, April 6-8, Designed to Be of Concrete Assistance to Electric Companies

WITH the theme, "Electric Power for a Strong America," the Institute's 27th Annual Convention in New Orleans, La., April 6-8, will offer a program designed to be of concrete assistance to electric utility companies in planning and working towards a future which will include greatly increased sales, tremendously expanded facilities and continually growing financial requirements.

In developing the program, the Convention Program Committee has obtained speakers who are outstanding in their fields and who will bring a background of experience and thorough study to the presentations they will make.

C. J. FORSBERG
Chairman, EEI Convention Program Committee

The Convention Program Committee is under the Chairmanship of C. J. Forsberg, President, Wisconsin Power and Light Co. Serving with Mr. Forsberg on the Committee are G. S. Dinwiddie, President, New Orleans Public Service Inc.; N. Bernard Gussett, President, Iowa Power and Light Co.; R. G. Rincliffe, President, Philadelphia Electric Co.; W. O. Turner, President, Louisiana Power & Light Co., and William Webster, Executive Vice President, New England Electric System.

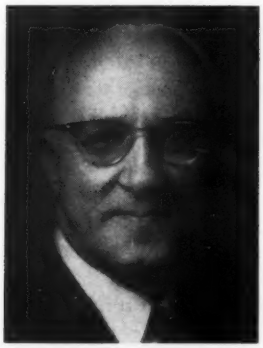
The first General Session will be held on Monday afternoon, April 6. Morning and afternoon sessions have been scheduled on Tuesday and Wednesday, April 7 and 8. All business sessions will be held in the Roosevelt Hotel.

J. E. Corette, President Edison Electric Institute, and President, The Montana Power Co., will deliver the keynote address at the opening session. Also at the opening session, there will be a presentation on the progress of EEI's new National Electric Living Program which is to be launched early in February. (See story on page 9.)

Among the important subjects which will be discussed at the Convention

G. S. DINWIDDIE

W. O. TURNER



N. BERNARD GUSSETT

R. G. RINCLIFFE

WILLIAM WEBSTER

Members of the 1959 Edison Electric Institute Convention Program Committee

are: Importance of air conditioning, heat pumps and electric space heating; the challenges before our industry from a woman's point of view; atomic power outlook in the United States and in the world; future physical plant development; rates and regulation; financing; scientific progress, including the industry's stake in education; the challenge to our industry in gaining approval and support of the American people.

The Convention schedule includes also a series of social activities, beginning with the President's Reception, Monday evening, April 6, in the Jung Hotel. The Ladies Luncheon will be held in the Jung on Tuesday, April 7. A fashion show and a cruise on a river boat also will be provided for the ladies. The final event of the Convention will be a program of entertainment presented through the courtesy of General Electric Co., Wednesday evening, April 8, in the New Orleans Municipal Auditorium.

To accommodate visitors who wish to arrive in New Orleans on the weekend preceding the Convention, registration facilities will be established in the Jung and Roosevelt Hotels on Sunday, April 5. Five major hotels—the Jung, Monteleone, New Orleans, Roosevelt and St. Charles—all are centrally located in the downtown section of the city. In addition to its hotels, New Orleans has a number of fine, well-equipped motels.

The registration fee of $15 covers admission to all business sessions and social activities. Identification for admission to these events will be by badges for gentlemen and pins for ladies, both obtainable only upon registration.

Official application blanks for hotel reservations have been mailed to member companies and additional blanks are available upon request to EEI at 750 Third Ave., New York 17, N. Y.

Reservation applications and inquiries concerning housing should be sent directly to the EEI Housing Bureau, P. O. Box 1460, New Orleans, La. When mailing hotel reservation applications, it is important to remember that names must be supplied for all rooms reserved and that block reservation requests without names cannot be accepted by the EEI Housing Bureau.

25th Annual Sales Conference Scheduled March 9-12

THE 25th Annual Sales Conference of EEI will be held in Chicago, Ill., March 9-12, at the Edgewater Beach Hotel.

Under the Chairmanship of Franklyn Dickinson, Ohio Edison Co., the Sales Conference Program Committee has prepared a program of wide appeal to sales departments of electric utility companies.

Although the program will point out sales achievements of the past 25 years, main attention will be given to the opportunities for selling which lie in the future for the industry.

General sessions have been scheduled for the mornings of Tuesday, Wednesday and Thursday, March 10, 11 and 12. Market sessions will be held on the afternoons of Tuesday and Wednesday, March 10 and 11. The general luncheon on Thursday will conclude the meeting.

E. O. George, Chairman of the EEI Commercial Division Executive Committee, and Vice President, The Detroit Edison Co., will open the conference and preside at the three general sessions. Also at the first session there will be a presentation covering the new EEI-sponsored National Electric Living Program.

Among the important subjects to be discussed at the other two general sessions are: the work and future plans for area development; research work in the field of vision; electric heating; new markets and new products, and selling in tomorrow's market.

Serving with Mr. Dickinson on the Program Committee are: E. J. Ingram, New Jersey Power and Light Co.–Jersey Central Power and Light Co.; W. M. Shepherd, Arkansas Power and Light Co.; A. M. Wade, The Connecticut Light and Power Co.

Increase Announced in EEI Bulletin Subscription Rates

Beginning with this issue, the subscription price of the Edison Electric Institute Bulletin will be increased from $2.00 a year to $3.00 a year for member companies and non-members in the United States and from $3.00 a year to $4.00 a year for non-members in foreign countries.

However, orders for subscriptions for the year 1959 received on or before January 31, 1959 will be accepted at the present rate.

This price adjustment is necessary because of continually rising production and paper costs.

Three-Point Program Is Designed to Sell More Electric Appliances, Wiring and Lighting—$2½ Million Budget for 1959

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PLANS for a powerful three-point program designed to sell more electric appliances, more wiring and more lighting in the homes of America have been announced by J. E. Corette, EEI President.

$2½ Million Budget

The Institute-sponsored National Electric Living Program will be launched during National Electrical Week, Feb. 8-14. The new program has a 1959 budget of $2½ million which will be used for daytime network television programs, national magazine advertising and point-of-sale promotional materials. The program will be under the guidance of the EEI Electrical Living Policy Committee which is under the Chairmanship of George W. Ousler, Vice President, Duquesne Light Co.

Mr. Corette said the program "is designed to represent a rallying point for manufacturers and other trade allies in the electrical field to concentrate and coordinate their selling efforts in the residential market." He added that "we expect to achieve a new effectiveness in selling electrical living at both local and national levels."

For the first time in its history the electric industry will have a national program uniting all segments of the electric and allied industries in one single purpose. "This new National Electric Living Program will prove of ultimate benefit to the consumer and to the entire American economy," Mr. Corette said.

The details of the new program were outlined at a recent press conference in New York by E. O. George, Vice President, The Detroit Edison Co., and Chairman, EEI Commercial Division Executive Committee. The 1959 Plan Preview giving full details of the program has been sent to member companies. Additional copies are available from EEI.

The three-fold approach of the program will focus greater public attention on the tremendous benefits electricity brings to modern living. The over-all program actually is composed of three individual interrelated programs. The first is known as the "Appliance and Medallion Home" program and is designated to stimulate demand for more electric appliances and all-electric homes. The second, "HOUSEPOWER," emphasizes the need for and benefits of more wiring capacity. "Light for Living," the third program, is designed to increase the demand for more and better lighting.

In addition to providing a chance for the electric industry to work together with a common purpose and common plan, the program offers an opportunity for more sales and profits for utility, manufacturer and contractor.

Appliance and Medallion Home Program

The Appliance and Medallion Home selling phase has been planned to meet these goals:

1. Create all-electric "climate" in the customer's mind.
2. Sell the electrical advantages of electric products.
3. Establish basic selling "events" throughout the year to take advantage of natural buying trends.
4. Create a program attractive enough to bring about industry-wide cooperation and support on a large scale.
5. Build a flexible, yet practical, platform for better coordinated local action.

As a basic part of the strategy to reach these goals in

are: Importance of air conditioning, heat pumps and electric space heating; the challenges before our industry from a woman's point of view; atomic power outlook in the United States and in the world; future physical plant development; rates and regulation; financing; scientific progress, including the industry's stake in education; the challenge to our industry in gaining approval and support of the American people.

The Convention schedule includes also a series of social activities, beginning with the President's Reception, Monday evening, April 6, in the Jung Hotel. The Ladies Luncheon will be held in the Jung on Tuesday, April 7. A fashion show and a cruise on a river boat also will be provided for the ladies. The final event of the Convention will be a program of entertainment presented through the courtesy of General Electric Co., Wednesday evening, April 8, in the New Orleans Municipal Auditorium.

To accommodate visitors who wish to arrive in New Orleans on the weekend preceding the Convention, registration facilities will be established in the Jung and Roosevelt Hotels on Sunday, April 5. Five major hotels—the Jung, Monteleone, New Orleans, Roosevelt and St. Charles—all are centrally located in the downtown section of the city. In addition to its hotels, New Orleans has a number of fine, well-equipped motels.

The registration fee of $15 covers admission to all business sessions and social activities. Identification for admission to these events will be by badges for gentlemen and pins for ladies, both obtainable only upon registration.

Official application blanks for hotel reservations have been mailed to member companies and additional blanks are available upon request to EEI at 750 Third Ave., New York 17, N. Y.

Reservation applications and inquiries concerning housing should be sent directly to the EEI Housing Bureau, P. O. Box 1460, New Orleans, La. When mailing hotel reservation applications, it is important to remember that names must be supplied for all rooms reserved and that block reservation requests without names cannot be accepted by the EEI Housing Bureau.

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4. Create a program attractive enough to bring about industry-wide cooperation and support on a large scale.
5. Build a flexible, yet practical, platform for better coordinated local action.

As a basic part of the strategy to reach these goals in

Four major selling "events" have been scheduled in 1959 in the EEI Appliance and Medallion Home Program. National television programs, national consumer magazines and point-of-sale materials will be used for promotion.

1959, four big selling "events" will be conducted. During February and March, the All-Electric Living event, with the theme "All-Electric Value Time," will be presented. In April and May, an All-Electric Kitchen event will take place, with the theme, "All-Electric Kitchen Carnival." This is to be followed by an All-Electric Laundry event in September and October, with the theme, "All-Electric Laundry Festival." The fourth event—in November and December—will cover All-Electric giving and has the theme, "All-Electric Gift Parade."

In all cases the flexibility of these buying events allows for a local program emphasizing *any* electric appliance.

The electric utility industry's continuing sales messages and buying events will be integrated with current electric industry advertising through daytime network television and national consumer magazine advertising.

On TV, EEI's plan calls for 32 weeks of programming, using three different 15-minute established shows on one day each week. The 32 weeks will be divided into eight weeks behind each of the four selling events. In all, there will be 144 individual, 60-second announcements during 1959 devoted to the selling of all-electric living and the specific selling of the electrical advantages of electric appliances.

Three-Part Messages

Each of the national commercial messages is divided into three basic parts. All will be filmed, using actors. In each program a 20-second opening announcement sells the idea of "Live Better Today the All-Electric Way" with a musical jingle and suitable scenes of home electrical living. In the middle part of the program a 38-second announcement sells the electric advantages of specific appliances. The closing commercial is devoted to the Medallion Home emblem and a reminder to "Live Better Electrically."

First Ads in February

The TV advertising will be supported and strengthened by ads in *Life* and *Saturday Evening Post* magazines. Ads kicking off the first big selling event will appear in February. concentrated around National Electrical Week. A three-page spectacular has been scheduled for both magazines. The three other events are to be supported by two-page, full color spreads.

The first page of the February ad, in black and white, traces in cartoon style the history of fuels down through the ages. Pages two and three of the ad will carry the headline: "Live Better Today . . . the All-Electric Way." These two pages will be in full color. The copy tells the electric story, sells specific appliance benefits and establishes the current event.

Point-of-sale materials, tied directly to the hard-hitting TV and magazine ads, will help create an all-electric climate, establish the buying event and support all manufacturers' point-of-sale materials.

The television advertising will be seen on 130 stations in 130 key markets and is expected to result in 720,000,000 viewer impressions.

The daytime television schedule offers balanced national coverage and continuity; supports manufacturers' night-time shows, and reaches the housewife—94 percent of daytime TV viewers are women.

HOUSEPOWER Program

A three-phase program also will be used in 1959 to sell the needs for rewiring millions of existing homes for full HOUSEPOWER.

Mass education of homeowners on the need for and benefits of more wiring is to be continued. A national program with enough flexibility for local tie-ins by utilities, contractors and others will be provided. Inter-industry support and cooperation will be attracted through advertising at all levels. Training and other aids are to be provided to make it easy for individual contractors to develop and expand their own local HOUSEPOWER programs, operating at the point of sale.

To meet the first 1959 objective, ads in *The Saturday Evening Post* and *Better Homes and Gardens* magazines will bs used. There will be 21 one-column black-and-white ads, telling the HOUSEPOWER story in limerick cartoon treatment. These ads will receive an estimated 250 million home owner impressions during the year.

National advertising is to be supplemented by comprehensive merchandising packages and the National Wiring Bureau's program promoting the contractor as a "HOUSEPOWER Specialist." Continuing support also is anticipated from the National Association of Electrical Distributors, The National Contractors Association, as will as other industry allies.

Tying in with local needs, there will be two scheduled HOUSEPOWER promotions a year, one in the spring and another in the fall. The Spring Promotion will use three different one-page ads in three different issues of *Look* magazine. The ads will be based on the popular editorial feature of *Look*—the Photo Quiz. The HOUSEPOWER ads will capitalize on this quiz format and develop a "HOUSEPOWER Photo-Test." Photographs of HOUSEPOWER situations will have multiple choice answers.

Reprints for Utilities

To localize the national advertising, the *Look* ads will be reprinted in a four-page folder and supplied to utilities in a complete kit of local materials.

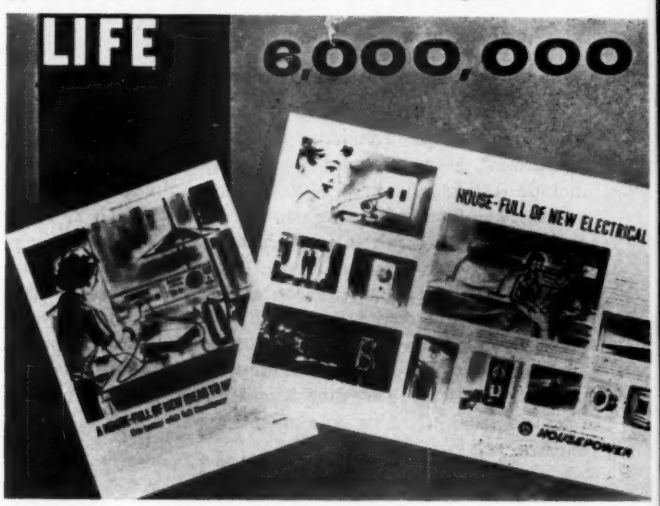
For the Fall push, *Life* magazine will be used. A three-page spectacular has been scheduled for a September issue. Big pictures in the *Life* editorial format will show many new contractor-installed devices that make HOUSEPOWER attractive and exciting to homeowners.

The headline on the first page of the ad reads: "A HOUSE FULL OF NEW IDEAS TO HELP YOU LIVE BETTER ELECTRICALLY WITH FULL HOUSEPOWER." The reader turns the page to a two-page spread.

In the simulated *Life* layout are some of the devices unknown to millions of homeowners, presented in the ad to glamorize some of the components of a modern wiring system. It is expected also to add an element of prestige to the function of the electrical contractor.

To provide an effective sales tool at the local level, the *Life* ad will be made available to utilities as a four-page reprint.

Ads for the Spring HOUSEPOWER promotion will appear in three different issues of *Look* magazine.



The Medallion Home and Appliance Program and HOUSEPOWER will be advertised in *Life* magazine.

These two magazines will carry ads on HOUSEPOWER and the *Post* ads will support the Medallion Home and Appliance Program in the NELP schedule for 1959.

'Light for Living' Program

For the first time in the history of residential lighting promotion, the industry now has a unified, national program—one that is expected to gain industry-wide enthusiasm.

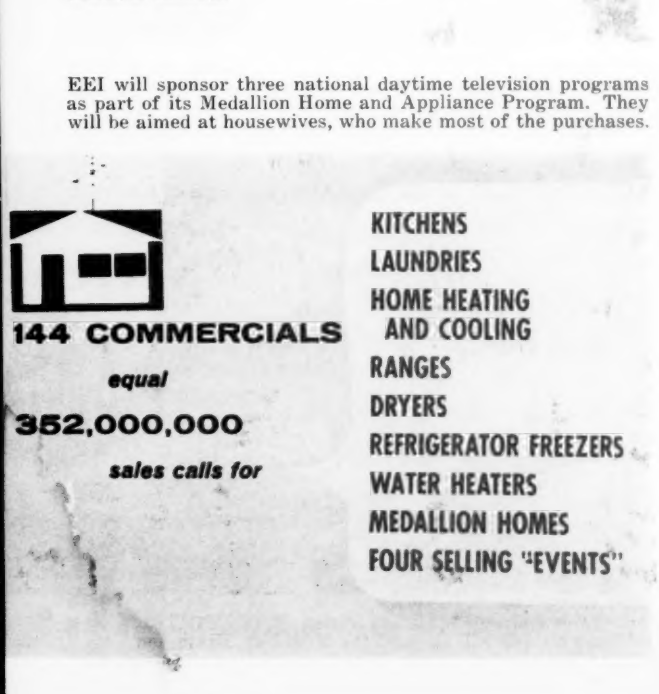
Called "Light for Living," the program is designed to create nationwide publicity, sell more and better lighting in new and existing homes, and bring more customers into retail stores. This unique and dynamic program is aimed at three key audiences—student architects, adult consumers and teenagers, and will be achieved primarily through a series of three annual contests.

The first phase of the program concerns student architects. In a special competition which has been approved by the Committee on Competitions of the American Institute of Architects, student architects of accredited architectural schools will be asked to design a "Light for Living Medallion Home." These homes will meet national minimum Medallion Home Standards and feature lighting. Ads in both the January and February issues of *House and Home* magazine, plus special mailings, will announce this competition. Suitable prizes are to be awarded.

Four Areas for Contestants

Contestants' designs may be entered in any one of four geographic divisions of the nation—Northeast, Northwest, Southeast and Southwest. These designs will include lighting fixtures, outlets and appliances. Entries are to be judged after the contest closes March 2, 1959, on best practical lighting design and best practical overall home design for whichever of the four geographic regions of the nation the contestant has entered. The judges for this competition will include a majority of AIA members, as well as lighting and utility experts. The competition will be promoted by trade advertising, posters, publicity and direct mail, both nationally and through local utilities to student architects and architectural schools.

EEI will sponsor three national daytime television programs as part of its Medallion Home and Appliance Program. They will be aimed at housewives, who make most of the purchases.



Next spring, participating member companies of EEI will be given the top award winning plans. They, in turn, will use them to urge local builders to construct as many of these model "Light for Living Medallion Homes" as possible.

The target date for opening these "Light for Living Medallion Homes" is September, 1959, after National Home Week. Again, there will be opportunities for both national and local publicity at that time.

Adult Consumer Contest

Concurrent with the opening of completed model homes, EEI and its participating member companies will announce a national adult consumer contest which has these objectives: To build a desire for better home lighting on the part of the consumer; and then to build local traffic into the "Light for Living Medallion Homes"; and to create traffic and sales opportunities for stores selling lamps, fixtures and bulbs.

This contest message will be carried in *Life, Look* and *Saturday Evening Post* during September and October. Concurrently with this consumers contest, the opportunity will be created to build local contests around the national contest. Ideas and materials will be supplied by EEI.

With the close of the adult contest, and the announcement of winners in December, 1959, the third phase of the Light for Living program, a contest for teenagers of high school age, will be announced. This contest is designed to create more national and local publicity; create an awareness of better lighting among future adults and their parents, and to build traffic and sales for retail stores.

The contest will ask the teenager to obtain an entry form and Light for Living booklet at local lighting dealers or utilities; check the lighting in his own home and two neighbors' homes, and write and submit an essay, advertisement or commercial on lighting. This contest is expected to create a backlog of acceptance among these future adults and through them reach their parents. The contest will not be conducted through schools. It is planned for early 1960.

The entire National Electric Living Program will be given national and local support through plan books, newsletters, bulletins, telephone calls, regional and local meetings and letters and brochures.

Publicity for the program will be covered by news releases for national consumer and trade magazines, releases for TV and radio networks, releases for newspaper and wire services and releases for local use.

As the program moves forward, data will be gathered, analyzed and released. This will include research information on program effectiveness at all industry levels, and acceptance of and attitude toward the all-electric living concept by the consumer.

The three television programs selected for sponsorship by Edison Electric Institute to promote its National Electric Living Program are "The Price Is Right," starring Bill Cullen; "Young Dr. Malone," a daytime serial, and "County Fair," starring Bert Parks.

The Adult Consumers' Contest will be one of the three contests sponsored by the Light for Living Program. Other contests will be directed at teen-agers and at student architects. Student architects will be asked to design a "Light for Living Medallion Home"; teen-agers will write an essay, commercial or advertisement on lighting, and the adult contest will be aimed at building a desire for better lighting in American homes.

"The Price Is Right," in the past year has become one of the top-rated daytime shows on television, and the night-time version of the program has helped to popularize the five-a-week daytime show.

Among 'Top 10'

This program attracts more requests for tickets than any other NBC television show. It has been the major factor in giving NBC a firm position in relation to other networks in daytime television. A Mark Goodson-Bill Todman production, it is consistently rated among the top 10 adult daytime programs.

The program features four contestants who bid on items ranging from toy train sets to mink coats. The contestant who is nearest the actual price of the object without overbidding receives that item as a gift. The show is seen at 11:15 a.m. local time.

"County Fair," a variety-fun show with Bert Parks as master of ceremonies, is an NBC production which is seen from 4:30-5 p.m., Monday through Friday. Reflecting a wholesome, fun-filled atmosphere of a typical American fairground midway, this program was a radio favorite before it was adapted for television.

Music, Acts, Games

The program offers a potpourri of tuneful music, top-flight acts, games, and amusing audience participation features.

Bert Parks is one of the leading personalities in this phase of show business. A veteran of the broadcasting field, he is familiar to homemakers throughout the country through his radio and television appearances.

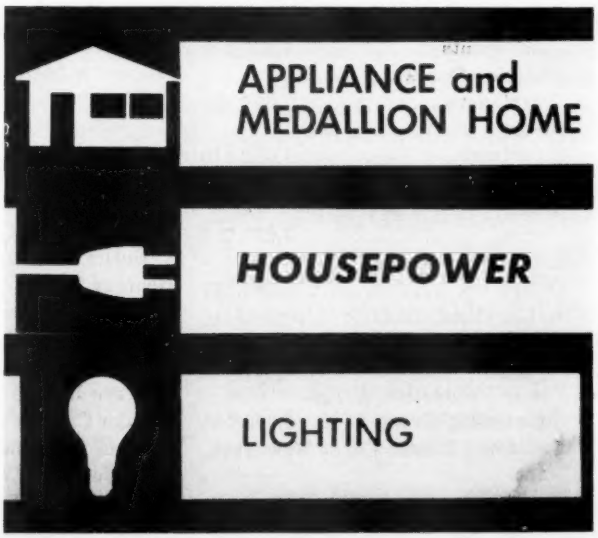
"Young Dr. Malone," which also is making its transition from radio, has been one of the most popular serial-type shows for the past generation.

Actually "Young Dr. Malone" will be created from the current "Today Is Ours" serial on NBC. William Prince, Hollywood and Broadway actor, will be starred in the dramatic serial. Mr. Prince was established as a leading Hollywood actor in the 1940's, and will be remembered on Broadway opposite Katharine Hepburn in "As You Like It."

"Young Dr. Malone" will be seen at 3:15 p.m. local time.

Because the programs will be taped, they can be shown at the same time in every time zone of the country.

The three interrelated programs of the EEI National Electric Living Program are designed to aid the utility, manufacturer, contractor, and appliance dealer.



72 Safety Achievement Awards Presented

Three Companies Cited for 3,000,000 Manhours of Operation without a Serious Accident between July 1 and Dec. 15, 1958

BETWEEN July 1 and Dec. 15 1958, EEI presented 72 Safety Achievement Awards to member companies for achieving 1,000,000 or more manhours of operation without a serious accident.

Three companies received awards for operating 3,000,000 manhours or more without accident. The Southern Division of Texas Power & Light Co. achieved 3,687,996 hours of accident-free operation. Baltimore Gas and Electric Co.'s Electric Distribution Department safely passed 3,007,403 hours of operation, and the Saginaw Division of Consumers Power Co. operated 3,005,977 accident-free hours.

The complete list of awards made during this period follows:

Alabama Power Co.
- Jasper District 1,000,079
- Western Division 1,000,683
- Gorgas Steam Plants .. 1,000,000
- Birmingham Division .. 1,003,897
- Substation Construction Employees 1,000,000
- Mobile Division 1,002,044
- Jackson Division 1,000,000

Appalachian Power Co.
- Roanoke District 1,000,000
- Beckley District 1,000,000

Baltimore Gas and Electric Co.
- Electric Distribution Department 3,007,403
- Electric Operating Departments 1,147,480
- Electric Operating Departments 2,094,828
- Electric Distribution Department 1,062,110

Central Illinois Public Service Co.
- Grand Tower Power Station 1,073,754

Central Power & Light Co.
- Entire Co. 1,181,327

The Cleveland Electric Illuminating Co.
- Electrical Division 1,057,696
- Power Production & Engineering Group 1,000,000

Consolidated Edison Co. of New York, Inc.
- Production Dept. — Astoria Generating Station 1,000,000
- Outside Plant Construction — Installation & Apparatus Bureau ... 1,000,000
- Outside Plant Construction Dept. — Underground Bureau 1,000,000
- Mechanical Construction Bureau 1,000,000
- Station Construction & Shops Dept. — Electrical Construction Bureau 2,000,000
- Commercial Buildings—Operations Bureau ... 2,000,000

Consumers Power Co.
- Electric Distribution Dept.—Saginaw Division 1,005,728
- Western Region Bulk Power Supply 1,005,008
- Central Division 1,003,257
- Jackson Division 1,024,930
- Saginaw Division 3,005,977

Detroit Edison Co.
- Construction & Maintenance Dept. — Beecher Machine Shop 1,000,145
- Production Dept. — Conners Creek Power Plant 1,000,000
- Underground Lines Department 1,097,294

Duke Power Co.
- P & T Operating Department 1,141,379
- Steam Department ... 1,072,897

Duquesne Light Co.
- Transmission & Distribution Dept. — Western District 1,000,208
- Transmission & Distribution Dept. 1,086,920

Florida Power Corp.
- Entire Company 1,072,648

Georgia Power Co.
- Plant Arkwright 1,060,170

Gulf States Utilities Co.
- Entire Co. 2,000,000
- Texas Divisions 1,000,000
- Lake Charles Division .. 1,000,000

Indiana & Michigan Electric Co.
- Marion-Muncie Division. 1,001,772

Interstate Power Co.
- Decorah District 1,001,935
- Albert Lea District 1,001,111

Jersey Central Power & Light Co.
- Entire Co. 1,454,420
- E. H. Werner Generating Station 1,069,016

Kentucky Power Co.
- Ashland District 1,000,495

Kentucky Utilities Co.
- Old Dominion Power Co. 1,022,341
- Old Dominion Power Co. —Mountain Division . 1,065,702

Minnesota Power & Light Co.
- Entire Co. 1,526,114

New Orleans Public Service Inc.
- Electric Operations 1,325,843
- A. B. Paterson Steam-Electric Generating Station 1,000,000*

Niagara Mohawk Power Corp.
- C. R. Huntley Station ... 1,000,000
- Dunkirk Steam Station.. 1,036,177

Northern Indiana Public Service Co.
- Gary District — Electric Operations 1,149,400

Northern States Power Co.
- Stillwater Division 1,007,414

Ohio Power Co.
- Entire Co. 1,000,000
- Philo Generating Division 2,000,000
- Central Division 1,000,000

Oklahoma Gas and Electric Co.
- Northern Division Operating Dept. 1,000,000
- Eastern Division 1,000,000

Pacific Power & Light Co.
- Portland District 1,000,000

Pennsylvania Electric Co.
- Williamsburg Generating Station 1,003,808

Philadelphia Electric Co.
- Southwark Generating Station 1,778,000**
- Engineering Department 1,295,860

Potomac Electric Power Co.
- Substation Department . 1,025,000
- Entire Co. 1,016,400

Public Service Electric & Gas Co.
- Essex Generating Station 1,000,096

* 10-year no-accident record.
** Seven-year record.

(Continued on page 18)

Future Use of Atomic Energy by Private Utilities

By Arthur S. Griswold
Vice President, The Detroit Edison Co.

PRIVATE utilities will build and use atomic power plants on a major scale just as soon as they can determine that such plants have an ecomonic advantage in the generation of electricity. Power companies have always sought and adopted better and less costly ways to generate and distribute electricity, and I am sure they will continue to do so, regardless of whether the use of atomic energy or some other as yet unknown method of generation is involved.

The question in part, therefore, is: When will the use of atomic energy for power generation become economically justified, and what will or should be the role of private utilities during the intervening period?

Some four or five years ago, there were many statements that "economic atomic power is just around the corner," or "we have reached the threshhold of economic atomic power." Such statements probably were inspired both by the desire to broaden participation of private industries through encouraging amendment of the Atomic Energy Act of 1946, and by an enthusiasm which took too little account of the economics of power generation and unawareness of the full significance of the many difficult scientific and engineering problems which were and still are involved. Such statements served to create a widspread feeling that by some sudden stroke of magic, atomic power plants would be commonplace in the more advanced countries. Power-hungry countries throughout the world began to believe that they could expect nuclear power plants, both large and small, in the very near future—plants which would alleviate most, if not all, of their economic problems.

I am sure that those companies associated with the various atomic power projects here in the United States that were beginning to take form at that time, had no such illusions and were of the opinion that at least 10 to 15 years of hard work lay ahead before atomic power would become truly economic.

• Statements made four or five years ago that "economic atomic power is just around the corner" were too optimistic.

• The paths toward economic nuclear power should become quite clear within the next 10 years, through new techniques applied to present reactor concepts or through entirely new concepts.

• Public opinion demands the early development of economic power from the atom and the private utilities must chart this course accordingly.

Recently, the views of some who claim to speak for the atomic industry have taken a somewhat pessimistic turn. This has been exemplified by several statements from the recent Geneva "Atoms - For - Peace" Conference, to the effect that the solutions of the problems involved in attaining economic power are proving more difficult than anticipated and that economic power may not be achieved until 1965, or perhaps 1970.

Use What's Available

Francis Perrin, High Commissioner, Commissariat a l'Energie Atomique of France, stated quite frankly that small countries lacking atomic experience and know-how should utilize conventional power equipment already available rather than wait for atomic plants which are not available.

It is true that the time schedules of some of the key atomic power development projects in the United States and overseas have slipped materially. It is my impression that the slippage has occurred simply because it has taken longer to complete research and development work than anticipated, rather than because the problems are more difficult. It is my impression too, that there is now a better understanding of the developments which are necessary before present nuclear reactor concepts can produce truly low-cost power.

With respect to atomic power for countries lacking widespread technical skill, most people experienced in complicated scientific and technical development have been reluctant to believe that nuclear reactor development programs are practical in such areas. Mr. Perrin's advice should be given thoughtful consideration.

Certainly the problems involved in achieving economic atomic power have not grown any easier with the passing of time, but many people fail to recognize the significance of several events that have taken place and the importance of several milestones that have been reached during the past three or four years.

The number and character of atomic power projects now under way in the United States are particularly impressive. A recent Edison Electric Institute publication, based upon information assembled by its Atomic Energy Committee, shows 123 power companies are participating in 27 nuclear projects.* These projects include three plants in operation; six plants under construction or contract; six plants in various stages of planning and 12 research, development and study projects, some of which may ultimately lead to construction projects. The participating companies, which include a large part of the major operating com-

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* Recent developments in this field bring the number of companies participating in atomic power projects to 129.

panies in the United States, are confident that the advances to be made in carrying out their programs of nuclear power development will make substantial contributions toward the realization of economic atomic power.

We all know, of course, that the United States Atomic Energy Commission has continued and increased its atomic power development activities both in scientific research carried on in its laboratories and in power development projects in cooperation with industry. In many instances—Shippingport, Experimental Boiling Water Reactor (EBWR) and Sodium Reactor Experiment (SRE), for example—the Commission has been the sponsor of the project.

Many Types of Reactors

The industry and the Commission projects embrace many different types of nuclear reactors and reactor concepts and ultimately will provide a most important fund of knowledge and information which can be used to develop more advanced and better reactors.

We should note here that as part of this broad effort, the construction of several power reactors, notably EBWR at Argonne National Laboratory, SRE at Santa Susana, Calif., General Electric Co.'s Boiling Water Reactor at Vallecitos, Calif., and Pressurized Water Reactor at Shippingport, has been completed and all are operating pretty much as planned. The AEC has announced that EBWR has operated at 60 percent above its rated capacity.

Overseas, the Calder Hall gas-cooled reactors of the United Kingdom Atomic Energy Authority have produced reasonably good results insofar as operation is concerned and the British have undertaken a large program—up to 6 million kilowatts of gas-cooled reactors for commercial power system use.

Important lessons have been gained from these domestic and overseas projects. It has been demonstrated that engineers and scientists now do have the know-how and ability to develop, design and construct power reactors that will operate reasonably well and to predict with accuracy the performance of such reactors with respect to safety and output. We are reaching the point where there should be confidence in our ability to build and utilize nuclear power reactors without creating public hazards. This feeling of confidence should apply to entirely new reactor concepts as well as to those where we have a background of experience.

The confidence of the manufacturers and engineering firms in their ability to design and build nuclear reactors of known cost and performance was clearly illustrated by proposals earlier this year which were submitted for the Senn project in Italy.

As you know, Italy lacks substantial fuel resources. Although it has a very large hydroelectric power potential, most of the low-cost sites have been developed. In order to balance Italy's power system, and to meet the varying water conditions as between seasons and wet and dry years, it is essential that Italy have close to 25 percent of its power in thermal plants. The fuel cost for thermal plants which could be built today is about six mills, and with the capital charges in Italy, the cost of power from thermal plants probably would be 10 to 13 mills.

In such circumstances, Italy is deeply interested in atomic power, and several projects for the construction of nuclear power plants are under serious consideration. The International Bank for Reconstruction and Development, more commonly known as the "World Bank," is cooperating with the Italian government, and a group of Italian utilities in the Senn (Societa Elettronucleare Nazionale) Project, a plan to build a nuclear power plant, 130-150 EMW, in Southern Italy. Last December, Senn invited about 15 companies to submit fixed price tenders for such a plant, and guarantees of the proposed plant's performance.

Nine Tenders Received

Nine such tenders were received, three of which were submitted by British companies proposing graphite-moderated gas-cooled reactors similar to those being built for the Central Electricity Generating Board in Britain. One was from a French group proposing a graphite-moderated gas-cooled reactor similar to the one being built by the Electricite de France at its Chinos plant. United States companies, or combinations of United States and European companies submitted five proposals—two for boiling water reactor plants, two for pressurized water reactor plants and one for an organic moderated and cooled plant.

These proposals were carefully evaluated for the World Bank by an international panel of nuclear scientists and engineers—two British, two American, one Frenchman, one Italian, and Dr. W. B. Lewis of Canada as chairman.

While the tenders are being held as confidential information, it is possible to discuss their substance in a general manner. There was the expected spread in capital costs of the proposed plants and because of the very massive structures that are required, the capital costs of the proposed gas-cooled reactors were substantially higher than those of the water-cooled reactors. On the other hand, the costs of the natural uranium fuel and fuel processing for the gas-cooled reactors were less than the cost of the enriched uranium fuel for the water-cooled reactors.

Costs Are Near

When all of the factors were considered, including capital and operating costs, it appeared that one proposed British gas-cooled reactor and one United States proposed water-cooled reactor were very close together in the cost of power, based upon 7,000 hours full load operation per year at just a little over 11 mills per kilowatt-hour. That probably is not as good as can be done by a modern oil-fired thermal plant, operating at such a high load factor. On the other hand, the cost of power does seem to be lower than is anticipated for most of the atomic plants that are under way here in the United States.

The International General Electric Company has been notified by Senn that it will receive the order.

The important point of this project is that manufacturers and engineering organizations were willing to submit fixed price tenders for a fairly large atomic power plant. The United States companies, at least, were willing to specify the designed output of the fuel elements, and to guarantee substantial expenditures to assure that the outputs would be met.

The most important result of these projects which have been completed, and of these that are in the design and construction stage, is the clarification of the problems that are in-

volved in order to achieve economic atomic power. It is known now, with considerable accuracy, for example, what it costs to build a pressurized water reactor of a given size. The cost of the fuel cycle for such a reactor based upon today's best performance can be calculated, and the areas in which cost improvements must be achieved can be clearly identified. This makes it possible to direct research and development activities more effectively to those areas such as fabrication and reprocessing where the greatest gains can be made.

The chief interest, of course, is what is likely to happen in atomic power development from here on, and what will or should be the part of private utilities. Many clues are given by the developmental programs now under way or being planned both in the United States and overseas.

Perhaps the first matter we should consider is the work of the Technical Appraisal Task Force on Nuclear Power of Edison Electric Institute. That group includes several of the most competent people in the nuclear power field, and has engaged a number of the most highly-regarded consultants to assist it in its activities. For more than two years the Task Group has been engaged in an intensive study of nuclear power and in July of this year published a report entitled "Status and Prospects of Nuclear Power — An Interim Survey," which previously had been submitted to EEI's Board of Directors.

In the Report

The report includes comprehensive yet concise statements concerning power reactors now being planned or built, the technological problems which must be resolved, and names additional reactor types and concepts suggested for future study and possible construction.

The report does not suggest any objectives, plans or program for the future development of atomic power. But certainly the need for forthright action by the power industry is fully evident to all who are sensitive to the public versus private power situation.

Present indications are that the atomic power development activities of the AEC will continue to expand. The fiscal 1959 authorization bill includes the approval of the construction of a 40-mw advanced gas-cooled reactor power plant. It also provides for studies and the design of several additional large reactors. The Commission invited proposals from industry before Nov. 1 for the construction of the gas-cooled reactor.*

Civilian Program Proposed

Of further interest is the "Expended Civilian Nuclear Power Program," proposed by the Joint Congressional Committee on Atomic Energy. This program, as presented in a Joint Committee print, dated August 1958, sets forth the following general objectives of the United States Government:

a. Achieve and demonstrate in the United States nuclear power competitive in cost per kilowatt-hour by 1970.

b. Achieve and demonstrate in high-cost free world nations, nuclear power competitive in cost per kilowatt-hour by 1968.

c. Fortify the position of leadership of the United States in the eyes of the world in the peaceful applications of atomic energy, particularly with regard to electric power.

The print also sets forth 10 technical objectives such as better fuel elements, use of plutonium as fuel, and breeding, and lists 21 reactors of diversified types and sizes which should be studied, one-half of which perhaps should be built in order to achieve the objectives. The reactors proposed coincide quite closely with those suggested by the EEI Task Group. The total cost of this program is estimated at $500 million.

In the administration of this program, the United States Atomic Energy Commission would continue to have responsibility for the conduct of the basic program of research and development through its National Laboratories, industrial contractors, universities and non-profit institutions. The Commission would be responsible also for positive direction of the reactor development program from the feasibility study stage through the construction and operation of experimental prototype reactors. Provision is made for cooperation of industry in such projects in somewhat the same manner as in the present Power Demonstration Reactor Programs.

Large scale demonstration plants also would be constructed by the Commission as a part of this expanded program if not otherwise provided by industry.

The Joint Committee has invited comment on this program from many different interested parties and there surely will be a determined effort to have it adopted as United States policy in the next session of Congress.

A somewhat different approach to an expanded development program was suggested by the General Electric Co. in San Francisco. It proposed two programs—"Operation Sunrise," a step-by-step development of the boiling water reactor intended to make economic atomic power possible in a large part of the United States by 1970, and "Operation Know-How," a program to build up to 50 small boiling water reactors in park-like surroundings open to the public. This program would serve to inform the public concerning atomic power, and to demonstrate the ability of private industry to carry on an effective and adequate nuclear power development program.

Quite obviously private electric power systems would have a substantial part in both these programs. General Electric certainly has demonstrated an outstanding ability in the boiling water field and unquestionably knows well the steps which must be taken to reach the ultimate development. Without a doubt, other manufacturers can and possibly will propose similar comprehensive programs for the reactor types which are of interest to them.

'Operation Know-How' Justified?

Whether a program such as "Operation Know-How" can be justified seems debatable. Certainly the public has a keen interest in atomic power. An average of nearly 100 casual visitors come to the Enrico Fermi atomic power plant site information center each day and organized groups contribute an equal number. Such interest is most encouraging. But it is of only incidental significance, and it would seem that the construction of a large number of admittedly uneconomic plants simply for informational pur-

* High Temperature Reactor Development Associates, Inc., has proposed to AEC that HTRDA build the gas-cooled reactor.

poses would be difficult to justify. The money could be used much more effectively to advance the art itself.

With the many proposals for atomic power development that have been put forth, and the insistent political pressures that are being exerted for early atomic power development, it is clear that there will be a continuing program for the construction of new atomic plants. Such projects necessarily will be undertaken either by private industry or by governmental agencies.

Opinions vary widely as to the proper methods of financing and directing such projects. Some of the outstanding leaders feel strongly that the major AEC activity should be limited primarily to research and development, with private industry carrying on the construction and operating phases. Others sincerely believe the government can and should build and operate a substantial number of first or second generation atomic power plants in order to accelerate atomic power development without jeopardizing the future of privately-owned power systems. It is presumed that such a program would develop economic reactor types for the benefit of all.

There are others who believe, apparently with equal sincerity, that the government should engage in a vast atomic power program, and thus extend public power systems to the point where the private electric power industry is brought completely under government domination.

Fortunately the AEC, with the support of Congress, has chosen to cooperate with private industry in its development activities. There is still an opportunity for the privately-owned power industry to continue as the dominating factor in atomic power development through participation in AEC reactor development projects.

The danger lies in the fact that more projects may be proposed for construction than the industry can support. The best defense against such a situation is to make certain that construction is limited to projects which will provide real advancements.

This is a difficult matter which begins at the time programs such as "Expanded Civilian Reactor Program" are formulated, and seemingly never ends. While there can be no criticism of the study of all types of reactors, such studies more often than not will show that the available knowledge concerning a given type does not indicate sufficient advantage to warrant a costly construction program. Industries should have an opportunity to examine and evaluate reactor studies and design before construction is approved. Here is a sensitive situation that will require a great deal of attention to Washington affairs.

As firm believers in the free-enterprise system of our country, and in the principles and objectives of the privately-owned electric power companies, we all strongly support the development of atomic power at an early date. We know that such development is time-consuming and costly—large sums must be spent for the construction of developmental projects.

Up to the present time, industries have been able (1) to propose projects of their own and (2) to participate in developmental projects of the AEC. There has been little reason for AEC to engage in a large number of government-financed projects. Whether this situation can be maintained is not clear but certainly private utilities must make every effort to keep the situation under control. I fully believe that utilities have this within their means.

The paths toward economic nuclear power should become quite clear within the next 10 years, either through new techniques applied to present reactor concepts or through entirely new concepts. The situation then should be somewhat less difficult. It will not be as hard to justify atomic projects which have a fair opportunity of being competitive in costs.

As businessmen, we are all deeply concerned with the high cost of atomic power development. However, we know that in the long run it is implicit that power users must pay for the cost of such development. Public opinion demands the early development of economic power and the private utilities must chart their course accordingly.

EEI Issues Revised Method for Electric Output Index

EEI has just issued a publication entitled "Weekly Electric Output Index (Revised Methodology)." This is a revised edition in which the process of removing weekly seasonal variations has been improved and simplified. These and other changes in method are explained to assist those interested in constructing individual system indexes.

This EEI seasonally adjusted index is representative of the total electric utility industry in the United States —all plants contributing to the public supply. It is based on the three-year average of electric energy available for distribution in the years 1947-1949 equaling 100, thereby providing a ready medium for comparison with other indexes.

The revised methodology was prepared by the Project Committee on EEI Indexes under the Chairmanship of Waite S. Brush, Consolidated Edison Co. of New York, Inc.

Copies are priced at 60 cents to member companies, $1.50 to nonmember companies and $1.60 to foreign countries. The publication number is 58-12. Address all requests to: EEI, 750 Third Avenue, New York 17, New York.

Safety Awards

(*Continued from page* 14)

Essex Division, Electric Distribution Department	1,003,948
Southwestern Gas and Electric Co.	
Entire Company	1,717,400
Texas Electric Service Co.	
Entire Co.	1,171,205
Texas Power & Light Co.	
Southern Division	3,687,996
Union Electric Co.	
Power Production Division	1,006,170

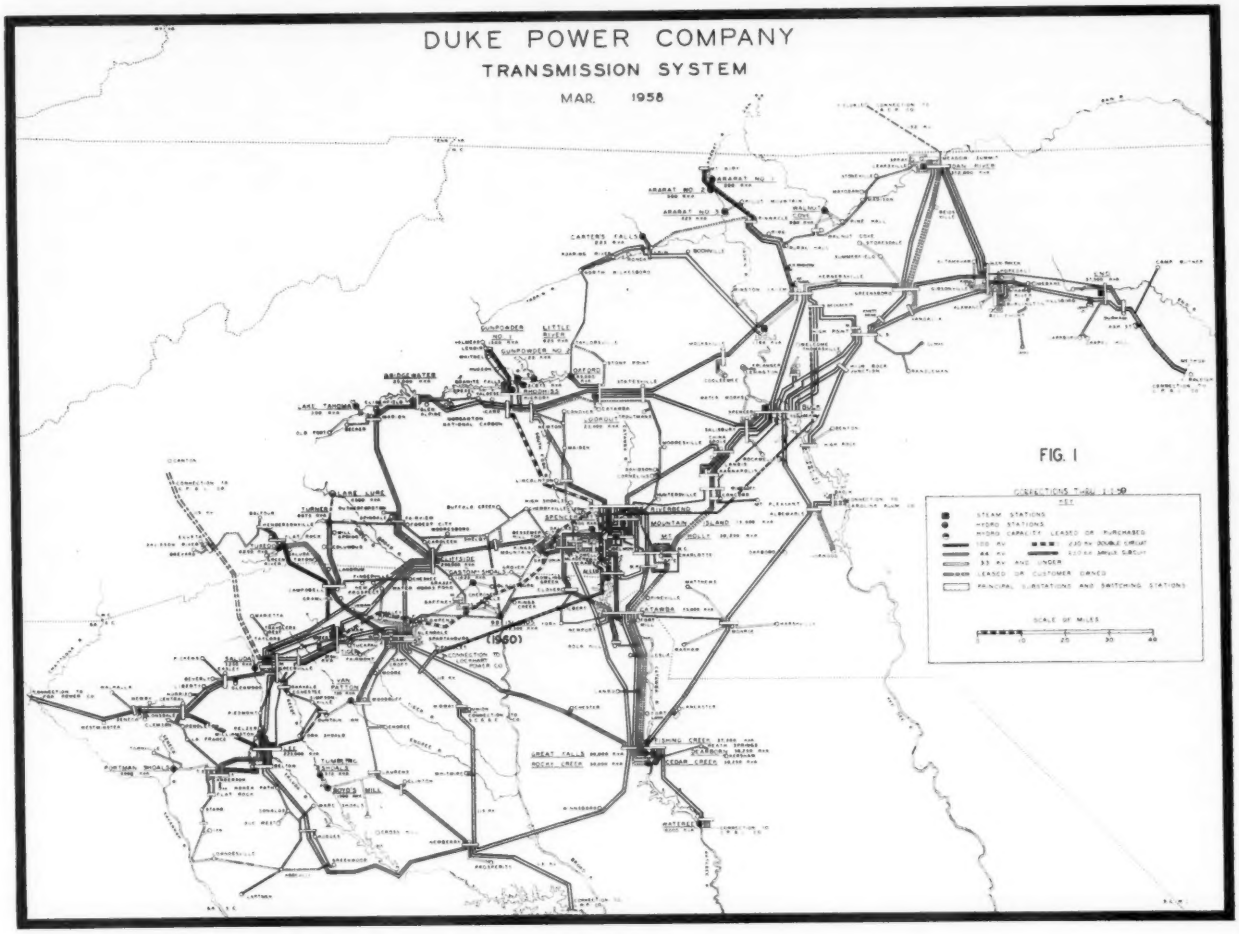


Figure 1

Bulk Power Planning

of the Duke Power Co. System

By F. W. Beyer
Planning Engineer, Duke Power Co.

THE Duke Power Co. service area comprises some 20,000 square miles in the Piedmont Carolinas, extending from the South Carolina-Georgia border on the southwest to the North Carolina - Virginia border on the northeast. The present net continuous capability of the system is 2,519 mw of which 1,668 mw, or about 66 percent, has been installed since the end of World War II. During this post-war period, generating unit sizes have more than doubled from 76 to 165 mw, while the maximum plant size has grown from 183 to 637 mw, an increase of 3.5 times.

Additional units under construction and authorized for service by mid-1961 will further increase the capacity of the largest plant to more than 1,100 mw and that of the largest unit to 260 mw. The total post-war expansion at that time will have exceeded 2.6 million kw and will have seen an orderly progression from a pattern characterized by development of relatively limited local load area plants through the first stage of development of centrally located high capacity sites with 230-kv transmission to major load areas.

The main objective of this paper is to review some of the considerations

Presented before the EEI Electric System and Equipment Committee Meeting, Charlotte, N. C., Oct. 15, 1958.

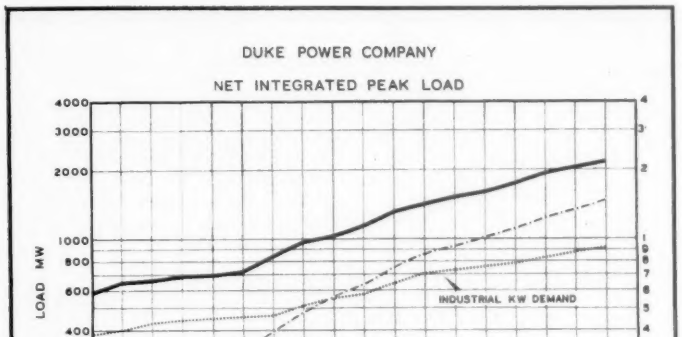


Figure 2

which entered into decisions resulting in this pattern of development and to outline the probable pattern of future expansion.

The Present System

The location of generating stations and major transmission lines in service at present is shown in Figure 1. The service area extends some 260 miles from southwest to northeast and about 150 miles from north to south at its widest point. Principal industrial loads are textiles, furniture, tobacco and reduction plants. Principal cities served are Durham, Greensboro, Winston-Salem and Charlotte in North Carolina and Spartanburg, Greenville and Anderson in South Carolina. The population of the area is in excess of 2.5 million, based on the last official census in 1950.

The company owns and operates 32 hydroelectric generating plants having dependable capacity of 430 mw. About 90 percent of this is located in 12 plants on the Catawba River, which runs generally north to south through the center of the system. The 10 hydro reservoirs on this river have a storage capacity of 214 million kwhr which is adequate to firm the installed capacity for peaking service under the minimum recorded annual stream flow. Total hydro production during an average water year is about 1.4 billion kwhr.

The present steam-electric generating capacity totals 2,089 mw, located in six plants as follows:

1. Dan River, located on the river for which it was named, and close to the Virginia border on the northeast sector of the system; 284 mw.
2. Buck, on the Yadkin River and centrally located with respect to Winston-Salem, High Point, Salisbury and Albemarle in North Carolina; 439 mw.
3. Riverbend, located on the Catawba River about 18 miles northwest of Charlotte; 637 mw.
4. Allen, also located on the Catawba River and about 12 miles downstream from the Riverbend plant; 330 mw.
5. Cliffside, on the Broad River adjacent to the Spartanburg, South Carolina area; 199 mw.
6. Lee, on the Saluda River midway between Greenville and Anderson in South Carolina; 190 mw.

All units are coal fired since this area has easy access to the Appalachian coal fields which annually produce from 35 to 40 per cent of all coal mined in the United States. Under existing mine price and transportation rates, economy dictates use of high volatile coal averaging 13,000 Btu per pound. Varying quantities of natural gas are also used at the Lee plant to the extent to which it is available. The average heat rate for all units for 1957 was 10,186 Btu per net kwhr, including all gas consumption at Lee and all fuel oil used in starting. The comparable figure for the first six months of 1958 was 9,926.

Transmission lines of the company consist of some 4,000 structure miles of various voltages and types of structures. Of these, about 2,000 structure miles are of two-circuit, steel-tower construction operated at 100 kv. About 200 structure miles of double circuit 230-kv, steel-tower lines, shown in Figure 1, are either in service or scheduled for completion this year. These will link the Riverbend and Allen steam plants to three different load areas. An additional double-circuit line from the Allen plant to the Spartanburg area of South Carolina is scheduled for 1960 and is also shown in Figure 1. Distribution lines consist of about 26,000 miles of circuits, primarily of wood-pole construction. Transmission and distribution losses, beginning with a high of 16 percent in 1938, have consistently trended downward and amounted to 10.2 percent in 1957.

There are seven interconnections of the 100-kv transmission system with five different companies. Four of these are normally operated in continuous synchronism as follows:

1. With the Appalachian Power Co. via the Dan River to Fieldale 138-kv line.
2. With the eastern division of the Carolina Power and Light Co. via the Durham to Raleigh double-circuit, 110-kv line.
3. With the western division of the Carolina Power and Light Co. via the Greenville-to-Canton, double-circuit, 110-kv line.
4. With the South Carolina Electric and Gas Co. via the Newberry-to-Lexington, double-circuit, 110-kv line.

The remaining three ties, with the Georgia Power Co. at Tallulah Falls, S. C., with the Yadkin Division of the Aluminum Co. of America at Badin, N. C., and with Carolina Power and Light Co. at the Wateree hydro plant in South Carolina, are available and used on prearranged schedules. An additional interconnection with Georgia Power Co. at 230 kv is planned in the near future.

System Load

Figure 2 shows a plot of system peak net integrated load and maximum non-coincident kw demands by years beginning with 1940 for large industrial users and for the smaller domestic and commercial loads including REAs and municipalities. Peak load growth over this period has been at a rate of nearly 9 percent compounded annually. Prior to 1956, the annual peak occurred predominantly during

December but with increasing air conditioning has occurred during August for the past two years. This trend toward summer peaks is expected to continue and intensify until the somewhat slower developing winter heating load becomes an offsetting factor. The peak hourly net integrated load during 1957 was 2,177 mw.

Over the 17-year period plotted, large industrial load growth has been at a rate of 5.2 percent, while for the domestic and smaller commercial loads it was 11.3 percent. Residential and small power demands amounted to 38 percent of the total in 1940, and had grown to 62 percent by 1957. Annual residential sales, in kwhr-per-customer, averaged 4,640 in 1957, about 45 percent higher than the 3,170 kwhr national average. This load is continuing to grow at a high rate and averaged 4,735 kwhr for the 12-month period ended June, 1958.

In preparing long range load forecasts for use in bulk power studies, various classifications of loads are studied in detail and projected in accordance with trends characteristic of the type of load and geographic location. Grouping of loads into four geographic divisions has provided a convenient tool for estimating interdivisional transmission requirements.

Development of Load Area Generation

Beginning with the first post-war units in 1948 and continuing through a total of 10 units by 1953, the basic plan for developing the system power supply was to locate new steam-electric generation as close to large load areas as available cooling water permitted. Some of the factors which favored this plan were:

1. Unit sizes as dictated by system growth rate, reserve requirements and economy of operation were suitable for the existing 100-kv transmission system.
2. Units could be scheduled to reduce transmission loss and minimize new transmission requirements.
3. Very minor differences in fuel cost at any of the available plant locations.
4. Minimum capital investment.
5. Minimum operating security.

Divisional concept offered many advantages in planning and operating the system and had been in use for many years. Each division had its own transmission problems and each could be integrated on the 100-kv system at two or more bussing points.

The Greenville and Lakewood Divisions contained both steam and hydro generation. The latter, primarily in the vicinity of Great Falls, could be switched between these two divisions as required by load and water conditions. The Bridgewater Division contained hydro generation only and the Durham Division was supported solely by steam generation. Divisional ties averaged 50 miles in length and had a normal transfer capability of about 50 mw. Based on the magnitude of divisional power transfer under normal and emergency conditions, new generation during this period was scheduled as follows:

1948	Two 62-mw units at the existing Cliffside plant.
1949 & 1950	Two 71-mw units at a new plant, Dan River, in the Durham Division.
1951	Two 95-mw units at a second new plant, Lee, in the Greenville Division.
1952	Two 110-mw units at the existing Riverbend plant in the center of the system, bearing on both the Lakewood and Bridgewater Divisions.
1953	Two 128-mw units at the existing Buck plant, also centrally located but within reach of both the Durham and Bridgewater Divisions.

Development of High Capacity Plants

While it would have been possible to continue the pattern of system expansion just reviewed, it was recognized that the timing of new units would become ever more critical and that if the economies of larger size units, which were becoming available, were to be realized, major strengthening of interdivisional transmission was required. Accordingly, beginning in 1950, intensive studies were made to investigate the merits of higher voltage transmission.

Since there was no significant fuel cost advantage at any of the existing plant or at available sites within the service area, economic justification for the higher voltage system was dependent on a long range reduction in capital investment and operating expense which might be realized due to: larger generating stations and unit sizes; deferment of area site openings; reduction in total reserve requirements; better use of natural cooling water resources; and more flexibility in construction schedules.

To evaluate these factors with as much precision as possible, many plans covering several different approaches to continued expansion were developed and studied. These included:

1. A continuation of development of area generation with all new transmission at 100 kv.
2. A combination of high capacity centrally located generating plants with fringe area generation timed to minimize high voltage transmission requirements.
3. Development of high capacity plants only, requiring significant high voltage transmission investment.

In formulating these plans, a design capability of 3,300 mw or a little more than twice the then existing system load was considered sufficiently high to provide accurate comparison, particularly for the initial phases of any of the plans adopted. Comparative results showed many advantages for those plans proposing high voltage transmission, especially for those in the second category, where additional fringe area generation could be timed to ease the transmission construction schedule. In developing such plans a reasonably high capacity plan was considered to be of the order of one million kw for which available cooling water, as well as reasonable access to all areas of the system, dictated location on the Catawba River.

To fully develop such a plant required transmission to deliver about 300 mw west to the Greenville Division and a similar amount east to the Durham Division, while a firm capability of half this amount was considered adequate to coordinate interim capacity additions in those areas. Since these two requirements could be met by double-circuit lines, this configuration was chosen for study.

Choice of 230 Kv

Final choice of 230 kv for the high voltage transmission was based on comparative studies of channels having a 400 mw minimum normal capability at voltage levels of 161, 230, 287 and 315 kv. The 161 kv was discarded because of higher cost, excessive right-of-way requirements and limited adaptability to long range plans. On the other hand, voltages higher than 230 kv showed a lower

unit cost if the additional capability were used but not appear attractive during the period under consideration. Anticipated cost trends of 230 kv equipment also appeared to favor this voltage.

The 230 kv now in service and that planned for future construction will consist of double-circuit, steel-tower design, having two overhead ground wires. Conductors, sized for expected long range loads, are 795, 954 and 1,272 MCM ACSR supported by 18 and 20 insulators on suspension and strain towers respectively. Autotransformers at receiver stations, having FOA ratings of 150 and 200 mva, are installed or planned generally on the basis of one for each 230 kv circuit. While both line and receiver stations are sized to carry the annual peak load in any area with any one of a double-circuit line out of service or for loss of any one transformer at receiver stations, a relatively high load factor has led to a decision to maintain a 900-kv BIL for all terminal facilities.

Beginning with 1954 and continuing through authorized 1961 facilities, new generation and major transmission have been in accordance with the second of the three approaches outlined above. With completion of this program, the first relatively high capacity plant, Allen, will have been completed with a net continuous capability of more than 1,100 mw and a significant start will have been made on the planned 230 kv system. In chronological order these additions will have included:

1954 Two 133-mw generating units at the Riverbend plant and installation of the first section of 230-kv transmission, consisting of a single-circuit on double-circuit steel towers from Riverbend west to the Tiger switching station, a distance of 75 miles.

1955 One 142-mw generating unit at Dan River. This unit temporarily deferred 230-kv transmission east to the Durham Division.

1956 Addition of the second 230-kv circuit from Riverbend to Tiger to firm the capability of one circuit.

1957 Opening of the Allen site with two 165-mw units and the first of two 230-kv circuits between Allen and Riverbend.

1958 One 165-mw unit scheduled for operation at Lee in December. This unit will defer additional 230 kv to the Greenville Division until 1960. A double-circuit 230-kv line from Riverbend north to the Bridgewater Division, a distance of 40 miles, and the first of two 230-kv circuits from Allen east to the Durham Division, 75 miles, are scheduled for completion this fall.

1959, 1960 and 1961 Allen units 3, 4 and 5 will be placed in service at yearly intervals. Units 3 and 4 will have a design capability of 260 mw net, while studies under way at present may result in a further increase for the number 5 unit to 282 mw net. New 230-kv transmission will include addition of the second circuit from Allen to Riverbend and to the Durham Division plus the previously referred to new double circuit line from Allen west to the Spartanburg area.

Future Expansion

In any long range plan for developing power supply, expansion of the 230-kv transmission system appears inevitable. Continuing studies, which have pushed the planned capability of the system to beyond 4,500 mw, have shown that the most economic pattern for the period immediately following 1961 includes development of at least one additional high capacity, centrally located generating plant before opening a new fringe area site. While this will require considerable extension of the 230-kv transmission system, many benefits will be realized. Some of these are:

1. Provides for early acquisition of land rights associated with major plant sites, transmission rights of way and tie station locations. These factors become increasingly important with increase in population density.
2. Current trends in generator design and cost indicate the use of increasingly larger unit sizes. Expansion of the 230-kv transmission system favors the use of large generators and is in keeping with anticipated technological advancements.
3. Provides for a more orderly and systematic development of the system. By opening a high capacity plant site and extending the 230-kv transmission system, generator capacity additions can be programmed independently from area requirements; this program may be advanced or retarded to meet changing conditions. Delay in opening new generating sites in both the Greenville and Durham Divisions until additional 230-kv transmission is in service will allow those sites to be developed for system rather than local area supply.
4. Extension of the 230-kv transmission system closely integrates system generating facilities. This results in more effective use of system reserve capacity, total required and spinning, and enhances economic loading of generators.
5. Development of a strong 230-kv grid provides easy access to all areas of the system if significant savings are indicated for possible future mine field generating plants.
6. The extended 230-kv will not only strengthen coverage of the service area but also will provide access to neighboring power companies for high capacity interconnections which are becoming increasingly desirable.

In addition to planning for future steam electric plants, due consideration has been given to facilities for peak load service only. As previously pointed out, the presently installed Catawba River hydro capacity is firm for peaking under minimum annual stream flow, and at the existing rate of load growth it is estimated that an additional 350-mw hydro capacity on this river will be firm and economical under the 1965 load curve.

To develop this capacity, it is planned to construct a new hydro plant, Cowan's Ford, between the existing Mountain Island and Lookout Shoals plants, about seven miles upstream from the Riverbend Steam plant. This plant will have a head of 112 feet which, in conjunction with existing plants, will have harnessed about 85 percent of the total 1,050-foot fall of the Catawba River on its 217-mile course through the Duke

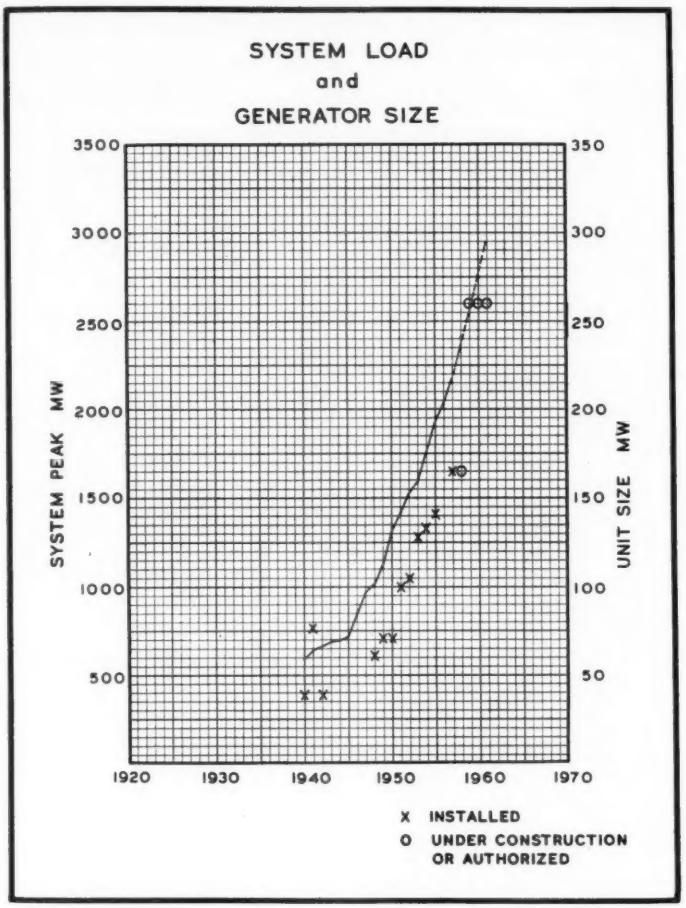


Figure 3

area. At present it is anticipated that the first three units, representing 262.5 mw of the total 350-mw design capability will be in service by mid-1963. Following this, the preferred plan will take advantage of the storage reservoir created by the Cowan's Ford development for cooling water for a new steam plant. After development of this site, the ultimate capacity of which is estimated to be 1,200 mw, and completion of Cowan's Ford to its 350-mw design capability, the 230-kv transmission system will have been strengthened to a point where new large capacity fringe area plants will be desirable.

Generator Reserve Capacity

Generator reserve requirements are a basic ingredient of any plan for developing bulk power supply. In general, these requirements depend on the type of system considered and consist of two components. The first component provides for adequate maintenance and servicing programs of major facilities and can be measured with reasonable accuracy. The second involves such unpredictable items as: forced or unforeseen outages of facilities, stretch-out of planned maintenance and inspection programs, departure of actual from estimated load and changes in the shape of the system load curve.

For the Duke system, reserves are estimated from detailed study of known factors and weighed consideration of contingent factors. In terms of peak load, reserve requirements immediately following World War II were estimated at 10 percent. Today this figure has increased to 15 percent due to the increase in number and size of generating units and to diminishing seasonal load variation brought about by the increasing summer load.

By the end of this year the system will have 25 steam-electric generating units of which 12 are of the reheat type. These reheat units range in size from 95,000 to 165,000 kw and each unit is opened for routine inspection every third year, requiring up to six weeks outage if no major repairs are necessary. Capability of non-reheat units ranges from 33,000 to 76,000 kw and they are routine serviced every fourth year, requiring about four weeks outage if no major repairs are necessary. In addition, state laws require annual inspection of all steam boilers and this work entails a seven-day shutdown for reheat and four days for non-reheat boilers, again assuming no major repairs.

While every effort is made to simultaneously service two or more units and to take advantage of spring and autumn seasonal load variation, the number of units has about reached the point where scheduled servicing on a 12-month basis is necessary. A 15 percent reserve represents about 385,000 kw for the 1959 load estimate. Such reserve will permit earmarking up to 165,000 kw of capacity for the servicing program, emergency outage of like capacity and permit a 55,000-kw margin for unexpected load growth.

By 1961, two units of 260 mw and possibly one of 282-mw net capability will be in service and the reserve margin will have increased to about 18 per cent of the estimated peak load. While reserve, expressed as a per cent of peak load, has little meaning unless related to the maximum unit size, total number of units, and shape of the load curve, consideration of these factors indicates the larger margin, including the capacity of interconnections, to be prudent.

Generation Performance and Investment

In the foregoing sections it has been pointed out that generator unit sizes have been constantly increasing and, in fact, that the anticipated gain in economy of the larger units was a major factor in the decision to establish a high voltage transmission system. Historically, the size of new units has averaged about 7 percent of the system peak load to date but will jump to about 10 percent in 1959. This is shown graphically by Figure 3 which shows the hourly net integrated peak load and the net continuous capability of units installed since 1940.

The importance of realizing every possible saving in investment and operating cost with each new unit is readily apparent when the trend of unit performance over the past several years is considered.

COMPARATIVE PLANT COSTS

Plant	Allen 1 & 2	Dan River 1 & 2 Lee 1 & 2
Placed in Service	1957	1949-50-51
Combined Capability—kw	350,000	350,000
Cost per kw of Capability—with Step-Up Substation (a)	$112.00	$97.90
Additional Cost per kw	$14.10	
Additional Cost per kw—%	14.4	
Design Performance—Btu net kwh	9,080	10,200 (b)
Gain in Performance	1,120	
Value of Gain in Performance—$/kw (c)	$14.70	
Comparative Cost per kw of Capability on Basis of Equal Performance	$97.30	$97.90

(a) Total Cost—including provisions for ultimate installation.

(b) Weighted Average 1.5" Hg ABP.

(c) Capitalized on basis of 60% annual L.F., 12% capital charge and fuel cost of 30¢ per million Btu.

Figure 4

At the end of World War II the maximum unit size was 76 mw, steam pressures were up to 1,250 pounds and steam temperature had reached 950°F. During the five years from 1948 to 1953, the size of units went up to 128 mw, the steam temperature up to 1,000°F., the pressure up to 1,800 pounds and the reheat cycle was adopted. With these developments the five year gain in performance was about 13 percent. Since 1953, including units now under construction, the size of units has more than doubled to 260-mw net, the steam pressure has gone up to 2,400 pounds and the main steam temperature to 1,050°F. In spite of these developments, the gain in performance for the 1957 Allen units, of 165 mw net capability, is only 2 percent better than for the 1953 units, and for the 260-mw 1959 and 1960 units, with a design performance of 8,900 Btu/net kwhr, the gain is only 3.9 percent. The fact is that within the subcritical pressure range and within the existing economic temperature limit of 1,050°F., we are approaching a condition where even minor additional gains are extremely hard to attain.

Figure 4 compares the installed cost of the 1957 Allen units 1 and 2 with that of the 1949-50-51 Dan River and Lee units. This comparison emphasizes that up to the present, the gain in efficiency was the important equalizing factor in keeping power production costs reasonably in line. However, because of the definite slowdown in possible gains in efficiency for the immediate future, the largest possible unit and plant sizes with their lower installation and operating costs are of increasing importance in the continuing effort to maintain stable consumer rates in the face of inflationary economic pressures.

A-Seminar Proceedings

THE transcript of "Reporting Nuclear News, a Conference for the Working Press," held in March, 1958, is now available. Sponsored by the Nuclear Energy Writers Association, the seminar included "Atomic Accidents: What Are the Real Hazards?;" "A Responsible Press in the Atomic Age;" "How to Save $500,000 with Atomic Energy;" "Why All This Atomic Power?;" "What Are All These Reactors?," and "Atomic Hysterias."

Copies are $1.75 each. Address requests to A. Bryan Marvin, Consolidated Edison Co. of New York, Inc., 4 Irving Place, New York 3, N. Y.

Two Courses for Electric Company Employees in the Fundamentals of American Progress

- *The American Economic System*
- *American Freedom*

Edison Electric Institute is now offering to its member companies two employee information courses of demonstrated effectiveness. Derived from authoritative sources, the facts contained in these programs are carefully designed to achieve a high level of employee interest and understanding through the use of colored film strips, illustrated booklets and demonstration materials.

For further information contact: Edison Electric Institute, 750 Third Avenue, New York 17, N. Y.

Many Educational Items Available As Silver Anniversary Approaches

25th Year of BLBS Bureau

THE most comprehensive catalog of educational materials on the benefits of better light that has ever been offered for industry use by the Better Light Better Sight Bureau has been assembled for 1959, the Silver Anniversary year of the Bureau, aaccording to Walter G. McKie, Bureau Chairman. The Bureau, which is sponsored by the electric industry, was organized in June, 1934, and will celebrate its 25th anniversary in June of this year.

Materials now available include several new pieces produced during or at the end of 1958 and cover lighting education activities at both the consumer and school level.

Each item supplied in the Bureau's program is designed to increase public understanding of the need for better lighting and thus spearhead the lighting sales promotional plans of electric power companies, electrical leagues and equipment manufacturers.

Innumerable Requests

Innumerable requests from schools and colleges, parent-teacher associations and other educational groups for suitable material to be used in instruction on the relationship between light and sight were another important factor in preparing a program of such wide scope at this time, according to Mr. McKie.

Consumer publications include "How to Make Homework Lighter," an eight-page illustrated folder about good lighting for study in the home; "Eyes, Our Windows to the World," a brand new, 32-page booklet on lighting and the science of seeing; "Sherlock Ohms and Dr. Watts," a 16-page comic book which weaves the principles of good home lighting into an interesting and amusing anecdote modelled after the stories of the famous sleuth of Baker Street; "Light an Aid to Sight," popular pocket-sized folder on home lighting, completely revised in December, 1958; Better Light Better Sight Plasticoat bookcovers for schoolbooks. "Light Is What You Make It," a 10-minute Technicolor motion picture produced for the Bureau by Walt Disney, also is available.

These are some of the materials that are available from the Better Light Better Sight Bureau, located at 750 Third Ave., New York 17, N. Y.

For school administrators, school board members and others interested in good school lighting, the Bureau publishes bi-monthly the magazine "Better Light Better Sight News." Utilities provide these magazines to schools in their service areas, either directly from the company, or through the Bureau's mailing service. Over 15,000 subscriptions are currently maintained for this periodical.

Teaching aids are offered by the Bureau, for direct use by classroom teachers to supplement existing curricula with information on light and sight. Currently four "kits" are offered, for four different teaching areas; elementary (4th, 5th and 6th grades), general science (7th, 8th and 9th grades), home economics and industrial arts.

Completely new this year is the elementary kit, "The Story of Light and Sight." Bureau committees, in cooperation with educational consultants, have been working on the new materials for over three years, to replace the previous elementary materials which carried the same title.

Teaching aids are placed with teachers in two different ways. The first of these is by direct utility company contact. Utilities contact school authorities, acquaint them with materials available as a service to the community. Utilities then supply materials as requested by the school authorities, and service the schools in whatever way is requested; as for instance, by loaning lightmeters, putting on demonstrations, etc.

The second method of distribution, new in 1958, is known as the Cooperative Teaching Aid Plan. This plan provides for distribution to teachers directly by the Bureau, but with local utility sponsorship, which is identified to the recipients. This plan eliminates manpower requirements at the local utility level and at the same time is sparked by teacher requests rather than utility solicitation. Growing rapidly, the Cooperative Teaching Aid Plan currently has over 100 sponsoring utilities.

Better Light Better Sight Bureau publications are designed to foster a better public understanding of the relationship of light and sight, and of the contribution to good seeing made by lighting in schools, homes, offices and industry.

In addition to the many excellent programs and publications now available for 1959 use, the Bureau is working on a number of new activities which will be announced later in the year, Mr. McKie reported. Two of these represent entirely new fields of endeavor for the Bureau.

The first is the rural education field. A Rural Service Committee is exploring ways to adapt present Bureau materials to the special needs of extension groups.

The second is the college field. The College and University Service Committee has in work a project which will provide materials on light and sight for use by teachers-to-be who are now studying at teachers' colleges and in the education departments of universities. The Bureau is being assisted in this work by members of the education department at the University of Indiana, under the direction of Dr. Paul Seagers.

The Bureau sells its publications to utilities and others on a self-liquidating, non-profit basis. Revenue from sales in 1958 was the highest in its 24-year history.

Indications are that 1959 will be considerably ahead of last year's record figure, Mr. McKie reported. As a result, the Bureau budget for 1959 is increased almost 50 percent over previous years, providing more working capital as well as additional help. Part of this increase, McKie explained, is to facilitate the handling of the increased volume of business that the Bureau has already experienced, while part will provide for still further expanded activities in 1959.

The Bureau's programs will be especially effective, Mr. McKie said, when used in conjunction with the industry-wide National Electric Living Program being launched by the Institute this year. This program includes a substantial allotment for the development of the residential lighting market. While the Bureau's work is educational and is not in any way involved in the promotion of residential or any other kind of lighting, it can be of tremendous help to the industry in providing tools for the consumer education which is so essential to reinforce and enrich the sales activities. It is partly for this reason that the Bureau invested heavily in the preparation of new materials in the second half of 1958, to be ready with the tools when the industry needs them.

New EEI Booklet Describes Role of Electricity in U. S. Progress

"POWER and Progress," a new illustrated booklet just published by EEI, shows the dramatic role the electric industry plays in the nation's progress and describes the opportunities in the industry's future.

Developed by EEI's Committee on Relations with Educational Institutions, the 32-page booklet provides a comprehensive, positive and non-controversial view of the electric industry which is expected to be of value to students, teachers, guidance counselors, employees, stockholders, and members of the public interested in general information about the industry.

Beginning with a picture of electrical living in the year 2000, the booklet describes the birth of the industry with Edison's development of the incandescent electric light and the first large-scale electricity supply system. It tells of the industry's early struggles in gaining acceptance for electricity and its applications, and how the U. S. attained world leadership in electric power.

The booklet describes in non-technical terms how the energy in a lump of coal, in falling water and in the heart of the atom is transformed into electricity and how electricity travels the networks of power lines to meet customer needs throughout the nation.

The price record is presented, with a discussion of the reasons why the average price of residential electricity is now less than half of what it was 25 years ago, while the cost of living has more than doubled during the same period.

The concept of regulation and the ways in which it is applied to the electric companies are described and the financial picture of the industry is briefly presented in general terms.

Finally, "Power and Progress" describes career opportunities in the industry, contributions electric companies make to community progress, and human benefits based on electricity now and in the future.

Prices of the new booklet range from 45¢ to 21¢ per copy depending on quantity. For information, write Edison Electric Institute, 750 Third Avenue, New York 17, N. Y.

Pennsylvania P&L Supports State Regulations Covering Operation of Boom-Type Equipment

Information Program on Safety Practices

A WIDE public information program was adopted by Pennsylvania Power & Light Co. in support of revised state regulations covering safety practices of personnel operating cranes, booms, hoists and other equipment near electric lines.

Among other provisions, the revised rule of the Pennsylvania Department of Labor and Industry states that no crane or hoist shall be operated within six feet of power lines unless appropriate arrangements have been made with the power company for proper safeguards.

The utility has taken steps to inform both owners and operators of such equipment of the new regulation and is supplying them with safe practices materials.

Chas. E. Oakes, Chairman of the Board of Pennsylvania P&L, said that with the increased construction work in recent years, "there has been an increasing number of accidents resulting from contacts with electric lines. He explained that in adopting these new regulations, the Department of Labor and Industry has taken a desirable step toward better safety for employees and the public.

As part of its cooperation, Pennsylvania P&L is sending a pamphlet explaining the hazards to contractors, to construction unions, to strip mine owners and to well-drilling firms. The pamphlet tells also how to avoid accidents and what to do in case of accidents. Bulletin board posters for construction offices and other worker gathering points are also being provided. "Warning" decals for posting in the cabs of construction equipment are also being made available to contractors.

The complete list of program materials developed by the utility is:

1. A printed excerpt from Department of Labor and Industry regulations showing the new rule and penalties for violation.
2. Letters to service area contractors, municipal officials and construction union officials describing the new rule and enclosing program materials.
3. A warning sign, called for in the new rule, for posting in cabs of all applicable equipment.
4. A safe practices pamphlet which was sent to contractors and unions for distribution to employees and members.
5. A bulletin board poster which was sent to contractors and unions for posting in construction offices and meeting places.
6. A news article which was released to service area newspapers to inform the general public of the Department's new rule and the company program.
7. A bulletin board notice for all company boards which solicited employee aid in detecting situations of the operation of such equipment near electric lines.

Pennsylvania P&L field division and district personnel directly contacted the editors of service area newspapers and provided samples of program materials in the hope of fostering further newspaper interest in this highly important subject.

Notice to Contractors

According to the safe practices materials sent out by the utility, a contractor working near electric lines is urged to notify the owner and operator of the lines so that any necessary safeguards can be taken.

The materials warn that all lines should be treated as "hot." It is also emphasized that bystanders be kept away and that no one should contact a rig in motion when it is near electric lines.

The utility also cautions that if accidental contact is made with energized lines, everyone should be kept away from the equipment and from fallen wires. The operator should then try to break contact with the wire and if this can't be done, he should "sit tight."

Any victim of a contact with energized lines or equipment should not be touched until contact has been broken, the materials warn. When the danger has been removed, the victim, if not breathing, should be given artificial respiration immediately.

Mr. Oakes cautioned firms and property owners not to locate wells under lines and suggested that at least 10 feet to either side of the lines of the power supply facilities was a sound idea from a safety standpoint.

As a word of safety for the general public, Mr. Oakes said that "do-it-yourself erection of TV antennae near power lines is extremely dangerous. It's no job for amateurs," he added. "Where antennae must be erected near power lines, leave it to the professionals. They have the proper tools, the equipment and know-how and the proper regard for the dangers involved."

New 'Pocketbook of Statistics' Available from EEI

"THE EEI Pocketbook of Electric Industry Statistics," 1958 edition, is available from the Institute. This is the seventh edition of the "Pocketbook" and contains 33 tables showing latest data available in concise and authoritative form.

The statistics are nationwide in scope and are drawn from such reliable sources as EEI publications and studies, Federal Power Commission reports and other government documents. The "Pocketbook" presents information on such subjects as capacity and production; capital and finance; sales, revenues and customers; fuels, and government ownership. Single copies are 35 cents; quantity prices upon request to EEI, 750 Third Ave., New York 17, N. Y.

Electrical System and Equipment Committee Meeting

- *Electrical Design Features of Duke's Allen Plant*
- *Remote Control of Switch Feeder Capacitors*
- *Impulse Testing of Electrical Machinery*

D. W. TAYLOR
Chairman

THE Electrical System and Equipment Committee held its 76th meeting at the Wm. R. Barringer Hotel in Charlotte, N. C., on Oct. 13-14. There were approximately 125 members and guests in attendance. This was the first time this committee has met in Charlotte.

The program consisted of presentation of papers, reports and discussions under the sponsorship of F. J. Berger, Chairman of the Subcommittee on System and Equipment Troubles; K. L. Wheeler, Chairman of the Subcommittee on Equipment and Station Design; A. P. Fugill, Chairman of the System Planning Subcommittee; V. J. Hayes, Chairman of Subcommittee on System Engineering, and R. M. Pennypacker, Chairman of the Subcommittee on Equipment and Station Operation and Maintenance.

On Sunday afternoon, Oct. 12, there was an inspection trip to the Allen plant, the new power station, of Duke Power Co.

On Monday morning in closed session the program of the Subcommittee on System and Equipment Troubles was presented. Various system disturbances and apparatus failures were informally discussed. F. J. Berger acted as sponsor and moderator.

On Monday afternoon in closed session a round table discussion of subjects of general interest which had previously been submitted by members was held; R. G. Meyerand, Committee Vice Chairman, was moderator.

On Tuesday morning G. W. Beyer presented a paper, "Bulk Power Planning of the Duke Power Company System." (See page 19.)

In the second paper on the Duke Power Co., J. Q. Wray described the electrical design features of the Allen plant. This plant will be the hub of the 230-kv transmission system, is located near Charlotte and is near both the geographic and load centers of the Duke system.

The majority of the committee members visited this plant on Sunday afternoon so were familiar with its general appearance. The Allen plant was designed and constructed by Duke's own engineering and construction departments. The site has been developed for an ultimate capacity of 1,200,000 kw and, when completed, will consist of five units with capacities ranging from 175 mw to 300 mw each.

The Allen plant is designed on the basis of a unit type system—one boiler, one turbine, one transformer for each unit. The power plant is of the indoor type with turbine, boiler and forced draft fans being fully enclosed.

Outdoor Equipment

Outdoor equipment includes induced draft fans, circulating pumps, fly ash precipitators and main step up and auxiliary transformers. The power plant enclosure permits maintenance of major equipment with minimum outage and maximum economy; in the design of the Allen plant, the enclosures were made to help pay a portion of its cost by enclosing the forced draft fans so that they take the combustion air supply from the top of the boiler room thus putting the waste heat to work.

J. H. Foote presented a brief dissertation upon international standardization. A report on his attendance at the IEC meeting in Sweden was included.

C. Wasserman, Baltimore Gas and Electric Co., presented a paper, "Increasing Effectiveness of Switched Feeder Capacitors by Automatic Remote Control."

The reactive requirements of electric systems have materially increased during the past 10 years and are expected to further increase with system expansions.

Capacitors Switched

The capacitors added to take care of this reactive load will have to be switched during light load periods to avoid generator and regulation limits. To obtain the greatest practical benefit of the use of these capacitors, it is planned to install the majority of them as close to the end of the three-phase mains of the 4-kv distribution feeders as possible and by properly controlling the capacitor switching, to obtain the desired voltage regulation with a minimum of conventional regulating devices, such as feeder regulators and load tap changing on transformers.

Mr. Wasserman said the capacitors are controlled either by voltage or reactive load measured at the station; the remote control equipment consists of a conventional power line carrier transmitter with spare unit coupled to the station bus. The receivers are transistorized and mounted in a socket type meter housing along with the necessary auxiliary equipment.

Various audio tones modulate the transmitter to operate the "on and off" functions of the individual receivers. A recording reactive meter is provided at the station to indicate the operation of the switched capacitors; this recorder also serves as a reactive monitor where var control is used.

A report on the impulse testing of electrical machinery, prepared by an ASA C-50 subcommittee, was presented by J. B. McClure of the General Electric Co. He is chairman of the ASA C-50 Subcommittee. The factual data used was furnished by members of the Electrical System and Equipment Committee; the data was analyzed and the report prepared by the ASA C-50 Subcommittee, consisting of both users and manufacturers. The conclusion reached by the subcommittee was that impulse testing of new generators was neither necessary nor economically justified.

Prime Movers Committee Meeting

- *Round Table Discussion of Design, Operating Problems*
- *Metallurgy and Piping Task Force Recommendations*
- *Report of the Atomic Power Subcommittee*

V. L. STONE
Chairman

THE Prime Movers Committee's first meeting of the 1958-59 Committee year—the 95th meeting of the group since its organization in 1933—was held October 6-8, at the Hotel Statler in Buffalo, N. Y. As usual the sessions were well attended, with 115 members and guests participating in the three-day program.

A special welcome was extended to Messrs. J. S. Anderson, Utah Power & Light Co.; T. A. Fearnside, Stone & Webster Enginering Corp.; M. J. Feldman, Boston Edison Co.; R. L. Hallman, Pennsylvania Power & Light Co.; M. C. Heffelman, Public Service Co. of New Mexico; A. T. Jorgensen, Long Island Lighting Co.; J. M. McGurn, Virginia Electric & Power Co.; T. C. Stavert, Southern California Edison Co.; F. H. Streit, Columbus & Southern Ohio Electric Co.; J. B. Taylor, Atlantic City Electric Co.; and W. H. Weise, Iowa-Illinois Gas & Electric Co., who have joined the Committee since its last meeting. With several retirements, the Committee's membership now numbers 96. Seventy-one companies of the 77 holding membership were represented at the meeting.

Following the customary pattern, the greatest portion of the meeting time was devoted to round table discussion, with the sessions of the first day, part of the second day, and the third day being required to cover more than 200 topics that had been submitted for consideration. On the afternoon of the first day the Committee adjourned at 4 p.m., allowing its 13 sub-groups to meet, preparatory to presenting their reports on the succeeding day. In addition to these reports, the agenda of the second day included progress reports of the several research investigations and technical projects sponsored by the Committee or in which it has an interest. The afternoon and evening of the second day were spent on field trips sponsored by Niagara Mohawk Power Corp., the host company, to its Huntley Station and the Sir Adam Beck Hydro Development of the Ontario Hydro Commission.

Round Table Program Important

Paralleling the growth of power plant technology and the increasing complexity of modern steam electric stations, the round table program of the Prime Movers Committee has developed in importance to members of the group. At present this forum, afforded by Committee meetings for the consideration of design and operating problems, has assumed a major role in the activities of each session. The conduct of the round table is under the direction of the vice chairman. To maximize the effectiveness of this information exchange agenda are distributed in anticipation of each meeting and members are requested to submit to the inquirers written statements covering their experience on the various question areas, in addition to discussing the subjects at the session. During the round table period of the Buffalo meeting reports were presented on unusual power station start-up occurrences and subjects regarding central station turbines, boilers, and the wide range of auxiliary equipment.

Project Groups' Activities

While subcommittee projects occupy relatively minor portions of time at each meeting, the Committee's 19 project groups and sponsors are actively following or conducting investigations in areas of special interest and importance to power station engineers.

On convening on the first day, members and guests were welcomed by C. J. Wick, Administrative Vice President, Niagara Mohawk Power Corp., who described the company's system and discussed the development of power on the Niagara River. This provided an interesting background to the inspection tour of the Huntley and the Sir Adam Beck Stations on the following afternoon.

While the EEI for a number of years has participated in several research programs on recommendation of the Prime Movers Committee, increasing attention is being directed by the studies of the subcommittees and the activities of other technical organizations to problem areas of concern to the Committee where research can contribute to the advancement of the industry.

At the Buffalo meeting particular emphasis was given to this trend by H. P. Seelye, former Manager of Engineering, The Detroit Edison Co., who has been employed for the past two years as a consultant to the Institute's Research Projects Committee. In this capacity Mr. Seelye has conducted a survey of research work in progress or recently completed by EEI and its member companies.

In appearing before the Prime Movers Committee Mr. Seelye cited the results of the survey and discussed the future program of the Research Projects Committee—pointing out the need for close coordination between that group and the Institute's engineering committees in determining research areas in which the EEI could appropriately participate. J. G. Miller will maintain liaison with Mr. Seelye's activities on behalf of the Prime Movers Committee.

Research received additional attention as the Committee considered recommendations of its Metallurgy and Piping Task Force that the EEI participate in the sponsorship of two metallurgical programs directed toward the application of certain alloy steels to high temperature, high pressure power station equipment. Based on the Task Force's study, the Prime Movers Committee will suggest Institute support of research in this area.

Several research programs under way to which EEI contributes on recommendation of the Committee were also reviewed. T. M. Hotchkiss reported on a Joint EEI-AEIC-Bituminous Coal Research, Inc., program on sulphur removal from coal and flue gas contaminants control; W. Welch described recent activities in the

ASME Fluid Meters Research Program; R. A. Baker reported on developments of the ASTM-ASME Joint Committee on the Effect of Temperature on the Properties of Metals; T. T. Frankenberg reported on the ASME High Temperature Steam Generation Project; R. M. Van Duzer discussed progress of the ASME Extension of Steam Tables program; and R. A. Baker reported for R. I. Smith of his company who represents the EEI on the ASME Research Committee on Corrosion and Deposits from Combustion Gases.

Included in the review of subcommittee programs was a report from J. K. Bryan, Chairman of the Boiler Auxiliaries Subcommittee. This group is studying the arrangement of certain auxiliary power station equipment. The Subcommittee anticipates that this project will define trends in practices regarding auxiliary equipment size and operation.

R. A. Baker, Chairman of the Boilers and Combustion Subcommittee, advised the Committee of recent activities of the ASME Power Boiler Test Code Committee. Mr. Baker also noted his subcommittee will report in the near future on its investigation of boiler casing and suspension problems.

Krieg Presents Report

The Metallurgy and Piping Task Force report presented by E. H. Krieg reviewed the programs of project committees of the Steam Power Panel of the ASTM-ASME Joint Committee on the Effect of Temperature on the Properties of Metals. Several of these project groups work closely with the Task Force, with certain Task Force members holding common membership on the Steam Power Panel groups. Mr. Krieg also advised the Committee of activities of Subcommittee XXII of the ASTM Committee A-1 on Steel, and reported on metallurgical and piping topics referred to the Task Force by Committee members, including ultrasonic testing of piping and pipe welding techniques for nuclear power stations.

J. W. Blake in his report of the Oil and Gas Power Subcommittee, called attention to development by equipment manufacturers in designing generating sources for peaking power.

R. F. Andres, Chairman of the Power Station Chemistry Subcommittee, reported on that group's 45th meeting held in Boston, Sept. 22-23, 1958. Sixty-six members and guests participated in this meeting during which reports by the Corrosion, Water Treatment, Instrumentation, Stream and Air Pollution, Coal Sampling, Lubrication, and By-Product Utilization Sections were presented. The next meeting of the Subcommittee will be held April 20-22, 1959, in Columbus, Ohio.

J. A. Lind, Chairman of the Power Station Data Subcommittee; F. F. Mautz, Chairman of the Power Station Structures and Facilities Subcommittee, and W. Welch, Chairman of the Station Instruments and Controls Subcommittee, reported on the status of projects under way by these groups. Mr. Welch's subcommittee's activities include studies of tie-line control, furnace puffs, and coal weighing devices. In conjunction with the subcommittee's report, J. A. Reich discussed central information systems installed in a number of stations.

Subcommittee Report

V. F. Estcourt reported on the status of projects of the Turbines and Condensers Subcommittee of which he is Chairman. In addition to the subcommittee's investigation of turbine unavailability causes, a project has been initiated on operating practices in restarting turbine units after shut down periods of varying lengths, and load pickup rate.

J. E. Geue, who with E. B. Ripley represents the Prime Movers Committee on the Joint Fire Protection Subcommittee, presented a discussion on operating practices and power station fire protection.

Landis Introduces Discussions

J. N. Landis, Chairman of the Atomic Power Subcommittee, introduced discussions by several Prime Movers Committee members on the status of nuclear power projects in which companies represented on the Committee are engaged. Mr. Landis is also Chairman of the Prime Movers Award Subcommittee and advised that Mr. Estcourt will be the 1958 recipient of this award, which is administered by ASME, for his paper entitled "Plant Management and Other Factors Affecting Maintenance Costs in Steam Generating Stations."

The Buffalo meeting was the final Committee session to be attended by E. C. Duffy as a member of the Prime Movers Committee. Mr. Duffy, who has served for the past year as vice chairman, is retiring from Committee activities because of increased responsibility within his company. Mr. Duffy has contributed greatly to the Committee during his years as a member; he will be succeeded as vice chairman by T. O. Thompson.

Scholarship Program Is Revised

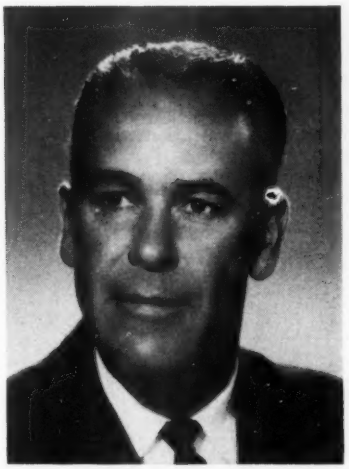
UNDER the revised agricultural scholarship program of Pennsylvania Power & Light Co., the three new scholarships awarded each year for study in the College of Agriculture at The Pennsylvania State University are open to high school seniors in PP&L's service area. Formerly a student had to be attending the university before he was eligible for the first year's scholarship.

The recipients retain their grants throughout their college career if performance and other standards are met. This means that 12 PP&L scholarship winners are in attendance at Penn State each year, three in each of the university's undergraduate classes.

In the original program, because the student had to be attending the university to be eligible, there were limitations on both quantity and quality of applicants. The new method encourages youngsters to attend college who otherwise would not have done so.

As a result of revisions to the program, new promotional materials were developed and a more expansive selling job done on the program, which previously had been promoted only within the college. The annual amount of each scholarship is $200.

People in Power



ROBERT T. PERSON

JOHN E. LOISEAU

ROBERT T. PERSON, an Executive Vice President of Public Service Co. of Colorado, has been elected President of the company, succeeding JOHN E. LOISEAU, who retired as President and was elected Chairman of the Board.

In other executive changes at the utility, WILLIAM D. VIRTUE, Executive Vice President, was named Executive Vice President in Charge of Company Operations, and WALTER W. HOWELL, Assistant Vice President, was advanced to Vice President and principal accounting officer to succeed Mr. Virtue.

Mr. Loiseau, in his new position as board chairman, will continue to take an active interest in company affairs. His retirement as president culminates over 15 years of service as the company's chief executive officer. He began his utility career in 1915, when he took charge of the accounting department of the Citizens Gas, Electric and Heating Co. of Mount Vernon, Ill.

He joined PSC as secretary and director in 1923 and was elected vice president in 1938. In this capacity he served as the company's principal finance and accounting officer until November, 1943, when he became president of the company. Through the years, Mr. Loiseau has been active in civic affairs and has long been recognized as a leader in the utility industry, both regionally and nationally.

Mr. Person started his utility career in 1936 in Albuquerque, N. M. Since that time he has served in various executive capacities in the gas and electric utility field. He moved to Denver in 1953 after serving six years as vice president and general manager of the Pueblo Gas and Fuel Co., a subsidiary of Public Service Co. He was elected a vice president of PSC in 1956 and a member of the company's board of directors in 1957. In April of this year he was elected an executive vice president.

Mr. Person has been a civic leader both in Pueblo and Denver. In Pueblo he served as president of the Chamber of Commerce, Kiwanis Club and Community Chest, as well as a director of the American Red Cross, Tuberculosis Society, and the Pueblo Symphony Society. He is a member of the Denver Rotary Club and director of the Denver Chamber of Commerce, Denver Convention and Visitors Bureau, Mile High United Fund and its Executive Committee. He also served as vice chairman of the 1958 Mile High United Fund Campaign.

Mr. Virtue, a 39-year veteran with the company, has been vice president and member of the company's board of directors since 1943. In 1953 he was elected treasurer and in 1958, an executive vice president. He is a member of the Edison Electric Institute.

Mr. Howell started his service with the company in 1924. During these 34 years, he has served as assistant secretary and assistant treasurer. In 1957 he was elected assistant vice president.

ROBERT N. HASKELL, Executive Vice President, Bangor Hydro-Electric Co., and President of the Maine Senate, has been elected President of the utility. He succeeds EDWARD M. GRAHAM who is retiring after 37 years as company President. Mr. Graham will continue as Chairman of the Board. Mr. Haskell will resign his Senate post.

Mr. Haskell started with the utility as a draftsman in 1921 while still an electrical engineering student at the University of Maine. He designed the Machias automatic generating station, pioneer of its type in New England. He was a construction engineer on the Ellsworth-Eastport transmission project and for two years was field engineer in charge of all line construction. In 1929 he was named head of all merchandising activities and was elected vice president of the company.

BYRON COHN, Manager of the Electric Department, and JOHN WILLIAMSON, Manager of the Gas Department, The Kansas Power and Light Co., have been elected Vice Presidents of the utility. They will continue in their present duties.

Mr. Cohn joined KP&L in 1930 as an electrical engineer. Before that time he was an engineer and new business manager for the Kansas Electric Power Co. He served with the infantry in World War I and then attended Kansas University, graduating in 1923 with a degree in electrical engineering. In 1938 he was appointed KP&L's chief engineer and in 1956 his title was changed to manager of electric operations. His responsibilities include overseeing the engineering, construction and operation of all of the utility's generating stations and the electric transmission and distribution systems.

Mr. Williamson has had more than 20 years experience in the gas business. In 1957 he was made general manager of the company's gas department and in 1958 was elected to KP&L's board of directors. He received a degree in chemistry and math from the University of Tulsa.

PAUL W. EMLER, Assistant Vice President, American Electric Power Service Corp., has been elected Commercial Vice President of the company. J. H. K. SHANNAHAN, commercial manager of the AEP System's Indiana & Michigan Electric Co., was elected assistant commercial vice president of the Service Corp.

In his new capacity, Mr. Emler will direct the sale of electric power throughout the seven-state AEP system.

The company also announced the organization of three new divisions within the commercial department and the promotions of three executives to head them: Rate Division—S. W. ANDREWS, Manager; Industrial Sales Division—JOHN G. HOWARD, Manager; and Residential & Commercial Sales Division—JOHN G. SNYDER, Manager. E. A. SNYDER, Manager of the Sales Division, was appointed to the newly-created position of Department Sales Consultant.

ELDON A. WERNER, Personnel Manager, Gulf States Utilities Co., has been elected Vice President of the company. New duties for two other executives of the company also have been announced. JOHN J. MORRISON, Executive Vice President, has been assigned duties involved in the general operation of the utility's system. RALPH E. CARGILL, Vice President in Charge of Engineering, Transmission and Distribution, has assumed power production responsibility.

Mr. Werner joined Gulf States in 1941 in the personnel department, and was appointed its manager in 1945. Mr. Morrison has been vice president since 1954, and Mr. Cargill has been vice president since 1955.

ROBERT W. JACKSON who joined the Gulf States' corporation department in 1955 was appointed an Assistant Secretary.

M. DALE FLAKE has been named Sales Manager of Arkansas Power & Light Co.'s Little Rock Division, succeeding ROBERT P. (BOB) WHITE, who has been transferred to the company's general office sales & development department in Little Rock. Mr. Flake is currently sales manager for the power company's Western division. In his new position, Mr. Flake will assume supervision over all AP&L sales personnel in the eight central Arkansas counties. An alumnus of the College of the Ozarks, he joined the company in 1937.

The creation of a new position—Training Adminstrator— and the promotion of JACK N. KRARAS, Pine Bluff Safety Engineer, to fill it also was announced by the company. He will work with management and supervisory personnel in formulating and directing training programs for AP&L personnel.

BRUCE M. MENEES, an AP&L employee for the past 19 years, becomes manager of the power company's Little Rock properties.

Kearney Named to EEI

JOHN J. KEARNEY, JR., Assistant Managing Technical Editor of *Electrical World* magazine, on Jan. 1 joined EEI as Staff Assistant and Secretary to the Committee on Atomic Power. He succeeds Max Ulrich who was appointed General Manager of Advertising and Industry Research for Consolidated Edison Co. of New York, Inc.

JOHN J. KEARNEY, JR.

Mr. Kearney earned BS degrees in mathematics and engineering at Notre Dame, and was a graduate instructor in mathematics at that university from 1946 to 1948. He was an electrical engineer with Ebasco Services, Inc., from 1948 to 1954, when he joined McGraw-Hill Publishing Co. He is secretary of the Public Relations Committee, American Institute of Electrical Engineers, and is a member of the American Society of Mechanical Engineers, Atomic Industrial Forum and Nuclear Writers Association.

Mr. Ulrich was commissioned in the U. S. Army Corps of Engineers after his graduation from the U. S. Military Academy at West Point in 1946. He was on active duty in the United States and Germany and became a captain in 1950. In 1951 he earned a master's degree in civil engineering at Massachusetts Institute of Technology.

WARREN A. KNIGHT has been named Director of Publicity for Public Service Electric and Gas Co. He succeeds the late JOSEPH A. GALLAGHER, who died Nov. 1. Starting with Public Service in 1951 as publicity assistant, Mr. Knight was made assistant director of publicity in 1957. A former newspaperman, Mr. Knight is a graduate of Pace College in New York City.

GORDON L. CALDERWOOD, Engineer of Gas Production, has been named Rochester Gas and Electric Corp.'s Assistant Director of Safety. He started to work at RG&E as a cadet engineer in 1927. In 1932 he became engineer in charge of by-product operations at East Station; later became engineer of gas production. He is a 1927 graduate of Massachusetts Institute of Technology.

J. R. NORTH has been elected President of Commonwealth Associates Inc. At the same time C. D. BIRGET and F. E. SANFORD were elected Vice Presidents of the professional engineering firm.

He succeeds J. H. FOOTE, who has been appointed director of engineering for Commonwealth Services Inc., parent company of Commonwealth Associates of which he has been vice president and director since 1949. Mr. North, who joined the Commonwealth predecessor organization in 1924, has been a vice president since 1949 and became executive engineer of the firm in 1956. He will continue in general charge of all engineering activities. He has served as vice president and director of the American Institute of Electrical Engineers and is a member of several national engineering committees. Mr. Foote will continue to function as chief engineer of Commonwealth Associates.

EDISON ELECTRIC INSTITUTE OFFICERS AND COMMITTEES

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H. S. SUTTON, *Treasurer*.....Consolidated Edison Co. of New York, Inc., New York, N. Y.
A. B. MORGAN, *Secretary and Assistant Managing Director*.....750 Third Ave., New York, N. Y.

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(Terms expiring 1959)

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R. E. RITCHIE, Arkansas Power & Light Co.
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ERWIN H. WILL, Virginia Electric and Power Co.

(Terms expiring 1960)

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J. J. MCDONOUGH, Georgia Power Co.
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G. W. VAN DERZEE, Wisconsin Electric Power Co.
J. THEODORE WOLFE, Baltimore Gas and Electric Co.

(Terms expiring 1961)

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E. D. SHERWIN, San Diego Gas & Electric Co.
N. R. SUTHERLAND, Pacific Gas and Electric Co.
L. V. SUTTON, Carolina Power & Light Co.
W. F. TAIT, JR., Public Service Electric and Gas Co.
WILLIAM WEBSTER, New England Electric System
C. H. WHITMORE, Iowa-Illinois Gas and Electric Co.

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A. D. BARNEY, The Hartford Electric Light Co.
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W. L. CISLER, The Detroit Edison Co.
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GEORGE L. MACGREGOR, Texas Utilities Co.
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HAROLD QUINTON, Southern California Edison Co.
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FRANK M. TAIT, The Dayton Power and Light Co.
J. B. THOMAS, Texas Electric Service Co.
E. S. THOMPSON, The West Penn Electric Co.
ALLEN VAN WYCK, Illinois Power Co.

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CHAIRMEN OF EDISON ELECTRIC INSTITUTE COMMITTEES (1958-1959)

(Continued)

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Plant Accounting and Property Records, L. W. BURNS.....Northern States Power Co., Minneapolis, Minn.
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Commercial Lighting, G. J. GILLEN.....Consolidated Edison Co. of New York, Inc., New York, N. Y.
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Street Lighting, G. G. WHEELER.....Northern States Power Co., Minneapolis, Minn.
Farm Group, P. R. SCHEPERS.....Consumers Power Co., Jackson, Mich.
Farm Development, M. H. LLOYD.....Niagara Mohawk Power Corp., Syracuse, N. Y.
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Home Service, JUDITH O'FLAHERTY.....Philadelphia Electric Co., Philadelphia, Pa.
Residential Appliance Promotion, E. J. HURLEY.....The Detroit Edison Co., Detroit, Mich.
Residential Lighting Promotion, R. J. MILLER.....The Cleveland Electric Illuminating Co., Cleveland, Ohio
Residential Wiring Promotion, J. R. FURBER.....Northern States Power Co., Minneapolis, Minn.
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Industrial Relations, E. J. BRILL.....Pennsylvania Power & Light Co., Allentown, Pa.
Investor Relations, L. E. REYNOLDS.....The Connecticut Light & Power Co., Hartford, Conn.

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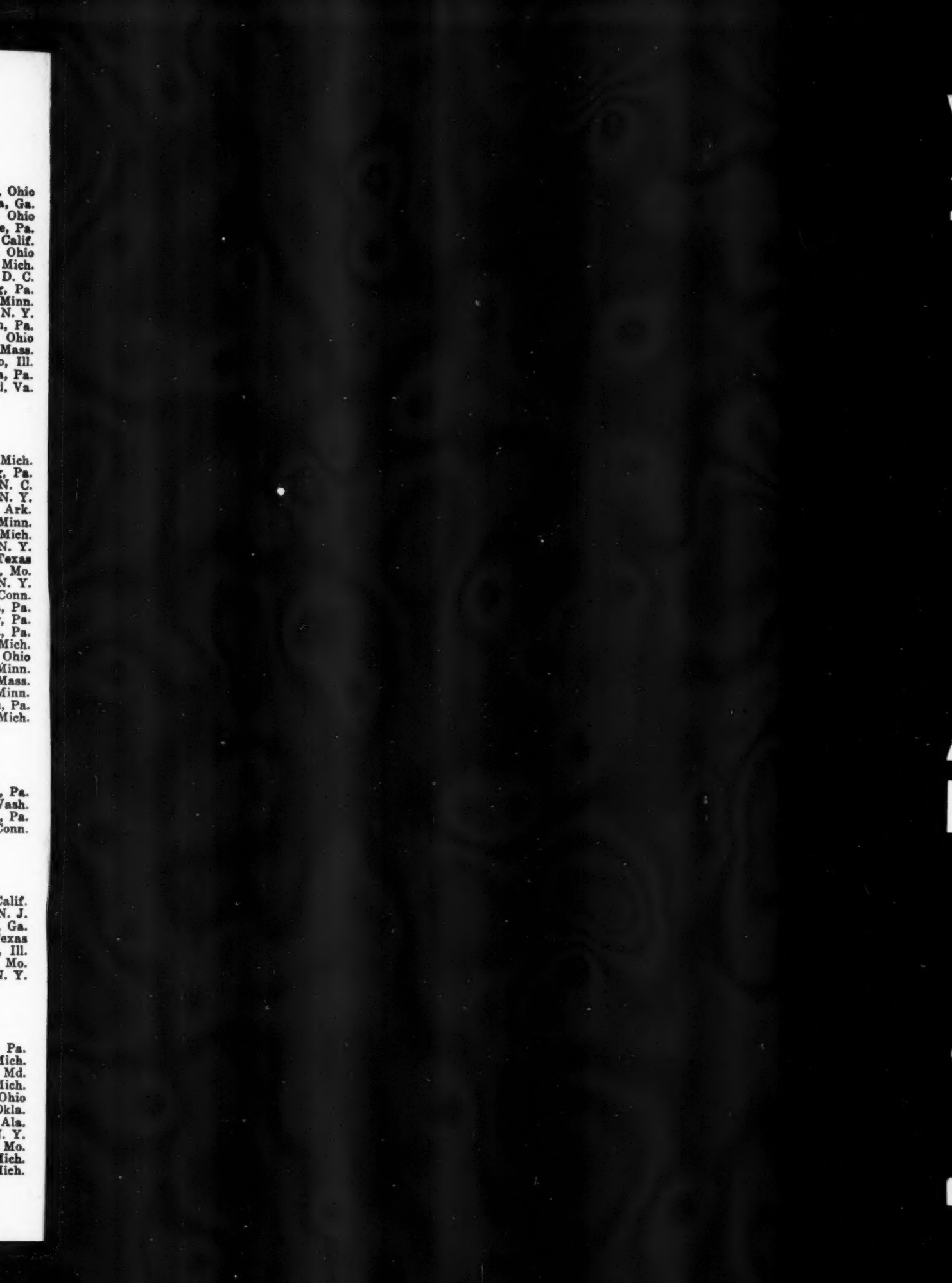
Transmission & Distribution, W. M. PENNEY.....Union Electric Co., St. Louis, Mo.
Transportation, W. B. STREITLE.....Rochester Gas and Electric Corp., Rochester, N. Y.

GENERAL DIVISION

General Division Executive, P. A. FLEGER.....Duquesne Light Co., Pittsburgh, Pa.
Accident Prevention, I. R. DOHR.....Consumers Power Co., Jackson, Mich.
Awards, M. C. ALBRITTAIN.....Baltimore Gas and Electric Co., Baltimore, Md.
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Insurance, D. E. WILLIAMS.....The Cleveland Electric Illuminating Co., Cleveland, Ohio
Legal, H. L. BRANAN.....Oklahoma Gas and Electric Co., Oklahoma City, Okla.
Purchasing and Stores, G. H. COLE.....Alabama Power Co., Birmingham, Ala.
Rate Research, K. W. HASBROUCK.....New York State Electric & Gas Corp., Ithaca, N. Y.
Research Projects, E. L. HOUGH.....Union Electric Co., St. Louis, Mo.
Statistical, A. E. BUSH.....The Detroit Edison Co., Detroit, Mich.
Technical Exchange for Overseas Visitors, HARVEY BUMGARDNER.....The Detroit Edison Co., Detroit, Mich.